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THE NIMBUS 6 DATA CATALOG

VOLUME 11

1 MARCH 1977 THROUGH 30 APRIL 1977

DATA ORBITS 8410 THROUGH 9226

GODDARD SPACE FLIGHT CENTER

GREENBELT, MARYLAND

THE NIMBUS 6 DATA CATALOG

Volume 11

1 March 1977 through 30 April 1977
Data Orbits 8410 through 9226

Prepared by

Management and Technical Services Company
Beltsville, Maryland

For the

Landsat/Nimbus Project

December 1977

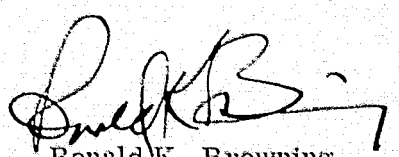
GODDARD SPACE FLIGHT CENTER
Greenbelt, Maryland

FOREWORD

This is the eleventh volume of a series of catalogs to be published by the National Aeronautics and Space Administration to document data acquired from the Nimbus 6 meteorological satellite. This volume covers the period from 1 March 1977 through 30 April 1977. Subsequent catalogs will contain documentation for succeeding periods throughout the useful lifetime of Nimbus 6.

Background information concerning the Nimbus 6 meteorological satellite system and a description of the experiments and data formats has been published separately in The Nimbus 6 User's Guide. Post-launch User's Guide information changes and corrections are included in the data catalogs. The Nimbus 6 catalogs present the type of data available, anomalies in the data, if any, and geographic location and time of the data.

The assembly and editing of this catalog was accomplished by the Management and Technical Services Company (MATSCO), Beltsville, Maryland, under contract number NAS5-23740 with the Goddard Space Flight Center, NASA, Greenbelt, Maryland.



Ronald K. Browning
Project Manager
Landsat/Nimbus Project
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SECTION 1

SUMMARY OF OPERATIONS

1.1 Introduction

Nimbus 6 was successfully launched from the Western Test Range, Vandenberg Air Force Base, California at 08 hr. 12 min. 00 sec. GMT on 12 June 1975. The orbit was nearly circular at 1093 x 1105 km. Satellite operations from launch through 14 July (orbit 425) consisted of engineering evaluation of all spacecraft systems. As a result of that effort, data reception, accountability and processing were intermittent during that period. Therefore, Volume 1 in this catalog series mainly reflects documentation from orbit 426 (14 July) through orbit 1082 (31 August). During orbit 4905 (12 June 1976), Nimbus 6 successfully completed one year of operations. Table 1-1 is a summary of the documentation for each Nimbus 6 Data Catalog volume.

Because the spacecraft power is limited, all experiments are not on at the same time. During this catalog period the THIR,* ESMR, ERB, PMR, and TWERLE/RAMS (Random Access Measurement System) were recorded for almost all orbits. The exception to this schedule occurred during orbit 8438 (3 March 1977) through orbit 9091 (20 April 1977) when the TWERLE experiment was not powered full-time due to a power management requirement. The other exception occurred when the ESMR experiment was turned off during orbit 9091 (20 April 1977). Full-time operations of the ESMR experiment will be resumed during the winter solstice of the Northern Hemisphere. Special severe storm coverage will be scheduled as required. ESMR data quality from both Horizontal and Vertical channels was good through orbit 6183 (15 September). After orbit 6184 (15 September), the Horizontal channel output went to zero and telemetry information indicates a failure of the Ferrite Dicke switch. The Vertical channel remains in good working order with data being collected and processed. These data are being used in the analysis of hurricanes and tropical storms. The SCAMS instrument functioned through orbit 4751 (31 May 1976); after the above mentioned date, the SCAMS instrument ceased to function due to a scan mechanism anomaly, see Section 5.3 of this catalog. The HIRS instrument failed during orbit 4697 (27 May) when a filter chopper motor anomaly occurred. As a precautionary measure, the HIRS subsystem was turned off. Due to the depletion of methane in the cryogenic cooler, the last useable data from the LRIR experiment was received during orbit 2801 (7 January 1976). The on-off cycle for each experiment is shown in Table 2-2 in Section 2 of this catalog.

Because of an anomaly in the functioning of the High Data Range Storage subsystem (HDRSS) B, first noted during orbit 33 (14 June), HDRSS B has been limited to 65 minutes of record capability (out of a possible 120 minutes). With only HDRSS B available for full-time use, there are occasional periods when global experiment

*THIR sensor fails during orbit 8820 (31 March 1977) and restarts during orbit 9088 (20 April 1977)

Table 1-1

Nimbus 6 Catalog Documentation Summary

Volume	Dates	Orbits
1	12 June 75-31 Aug. 75	1-1082
2	1 Sept. 75-31 Oct. 75	1083-1900
3	1 Nov. 75-31 Dec. 75	1901-2717
4	1 Jan. 76-29 Feb. 76	2718-3521
5	1 Mar. 76-30 Apr. 76	3522-4338
6	1 May 76-30 June 76	4339-5155
7	1 July 76-31 Aug. 76	5156-5985
8	1 Sept. 76-31 Oct. 76	5986-6802
9	1 Nov. 76-31 Dec. 76	6803-7619
10	1 Jan. 77-28 Feb. 77	7620-8409
11	1 Mar. 77-30 Apr. 77	8410-9226

coverage is not obtained. (These occur when the Orroral, Australia STDN station is not available for playback of recorded experiment data.) The areas not covered are usually over the western part of the Pacific Ocean and/or the eastern part of the Atlantic Ocean. During orbit 4641 the HDRSS A recorder failed to record. Prior to the above date, HDRSS A was successfully used operationally 120 minutes every other orbit with HDRSS B providing 65 minutes of alternate coverage. Complete failure of HDRSS A occurred during orbit 4713 and despite many attempts to engage the system in a record mode, it has not recorded since orbit 4713 (28 May). The areas most affected by the lack of HDRSS A experiment coverage are the latitudes north of the Equator during the nighttime orbital passes. The daytime coverage remains virtually unchanged with the exception as noted in the above paragraph.

The pitch of the Nimbus 6 satellite has been made to alternate between +2.0 degrees, +0.6 degrees, and 0.0 degrees since launch. Table 1-2 lists the orbits when each pitch position was used.

A positive pitch angle of 0.6 degrees moves the nadir-looking position 11.5 kilometers ahead of the subsatellite point. A positive pitch angle of 2.0 degrees moves the nadir-looking position 38.3 kilometers ahead of the subsatellite point.

At these pitch angles, a scanner-type instrument no longer scans the earth along a great circle arc through the subpoint, but scans along the small circle formed by the intersection of the scan plane with the earth. Since the plane of the small circle is tilted with respect to the nominal scan plane, points on the arc are displaced farther from the great circle as the scan angle increases. As noted above, a pitch angle of 0.6 degrees causes a displacement of 11.5 kilometers at nadir, but when the scanner turns 45 degrees away from nadir the displacement increases slightly to 12.8 kilometers. Similarly, for a 2.0 degree pitch the displacement is 38.3 kilometers at nadir

Table 1-2

Pitch Positions for Nimbus 6
01 March 1977 through 01 May 1977 (Orbits 8410-9233)

Pitch Change			Pitch Bias	
Date (1977)	Orbit and STDN	Time (GMT)	+0.6°	+0.0°
1 March	8412R*	0459		X
1 March	8422A*	2234	X	
2 March	8425R	0421		X
2 March	8434R	2002	X	
3 March	8440R	0710		X
4 March	8461A	2023	X	
5 March	8468A	0914		X
5 March	8476A	2322	X	
6 March	8479R	0508		X
6 March	8489A	2238	X	
7 March	8495A	0938		X
8 March	8512A	1559	X	
9 March	8518O*	0353		X
9 March	8727A	1849	X	
10 March	8731O	0308		X
10 March	8542A	2140	X	
11 March	8548A	0839		X
11 March	8556A	2246	X	
12 March	8558O	0334		X
12 March	8568A	2013	X	
13 March	8572R	0348		X
13 March	8581A	1932	X	
14 March	8586R	0452		X
14 March	8595A	2036	X	
15 March	8601A	0739		X
15 March	8610A	2330	X	
16 March	8615A	0842		X
17 March	8626R	0440	X	
17 March	8631A	1319		X
18 March	8637W*	0009	X	
18 March	8642A	0907		X
18 March	8650A	2314	X	
19 March	8656A	1009		X
19 March	8662A	2042	X	
20 March	8668A	0741		X
20 March	8677A	2333	X	
21 March	8683A	1034		X
22 March	8694R	0634	X	
23 March	8705O	0255		X

Table 1-2 (continued)

Pitch Change			Pitch Bias	
Date (1977)	Orbit and STDN	Time (GMT)	+0.6°	+0.0°
24 March	8717A	0033**	X	
24 March	8725A	1348		X
25 March	8743A	2151	X	
26 March	8748R	0047		X
26 March	8757A	2247	X	
27 March	8764A	1145		X
28 March	Missing Data		X	
28 March	8776A	0915		X
28 March	8783A	2134	X	
29 March	8791A	1207		X
29 March	8797A	2237	X	
30 March	8804A	1125		X
30 March	8809A	2010	X	
31 March	8816A	0846		X
31 March	8822A	1927	X	
1 April	8830A	1001		X
1 April	8835A	1846	X	
2 April	8843A	0923		X
2 April	8850A	2148	X	
3 April	8857A	1024		X
3 April	8863A	2156	X	
4 April	8870A	0942		X
4 April	8875A	1829	X	
5 April	8884A	1048		X
5 April	8889A	1933	X	
5 April	8897A	1000		X
6 April	8902A	1852	X	
7 April	8911A	1112		X
7 April	8916A	1956	X	
8 April	Missing Data			X
8 April	8930A	2101	X	
9 April	8939A	1321		X
9 April	8943A	2019	X	
10 April	8952A	1239		X
11 April	8957A	2124	X	
11 April	8966A	1343		X
11 April	8970A	2042	X	
12 April	8978A	1116		X
12 April	8982A	1815	X	
13 April	8992A	1220		X
13 April	8996A	1919	X	

Table 1-2 (continued

Pitch Change			Pitch Bias	
Date (1977)	Orbit and STDN	Time (GMT)	+0.6°	+0.0°
14 April	9004A	0950		X
14 April	9010A	2023	X	
15 April	9018A	1057		X
15 April	9022A	1757	X	
16 April	9032A	1203		X
16 April	9036A	1900	X	
17 April	9047A	1450		X
17 April	9051A	2150	X	
18 April	9060A	1409		X
18 April	9064A	2109	X	
19 April	9073A	1328		X
19 April	9077A	2028	X	
20 April	9086A	1248		X
20 April	9091A	2126	X	
21 April	9100A	1352		X
21 April	9104A	2052	X	
22 April	9110A	0749		X
22 April	9116A	1823	X	
23 April	9127A	1410		X
23 April	9132A	2301	X	
24 April	9139A	1141		X
24 April	9143A	1842	X	
25 April	9152A	1102		X
25 April	9158A	2137	X	
26 April	9162R	0509		X
26 April	9162R	0510	X	
26 April	9167A	1354		X
26 April	9172A	2244	X	
27 April	9182A	1641		X
28 April	9187O	0250	X	
28 April	9195A	1602		X
28 April	9198A	2114	X	
29 April	9203R	0637		X
29 April	9210A	1849	X	
30 April	9220A	1253		X
30 April	9225A	2139	X	
1 May	9233A	1212		X

*A = Fairbanks, Alaska; R = Rosman, North Carolina; O = Orroral, Australia; W = Winkfield, England
**Underlined time frames indicate possible error of plus or minus 20 minutes from the exact interrogation time.

and increases to 42.6 kilometers at a 45 degree scan angle. Thus, although the instrument records in lines normal to the orbit plane (in the absence of yaw) the perpendicular displacement from the perfect-attitude scan line is not uniform across the scan line.

Subsections 1.2 through 1.10 of this catalog summarize the operational highlights of the individual experiments, present preliminary experiment results, and call attention to known data anomalies. Section 2 lists the on-off times for each experiment and provides a method for determining the geographical coverage of each experiment. Section 3 shows selected ESMR images, and Section 4 presents THIR montages. Section 5 presents corrections to The Nimbus 6 User's Guide.

The user is referred to The Nimbus 6 User's Guide for a complete description of each experiment and to Section 1.7 of that Guide for the requesting procedure and sources for all data. Section 2, 3, and 4 of this Data Catalog should help users select data to meet their needs.

1.2 The Temperature Humidity Infrared Radiometer (THIR) Subsystem

The THIR Radiometer Mirror anomaly previously reported in Volume 8 and 9, was again noted from 31 March (orbit 8820) through 20 April (orbit 9088). After orbit 8195 the Radiometer Mirror anomaly was corrected and THIR operations are back to normal. Daily world montages of the THIR are presented in Section 4 of this catalog. All processed THIR film is archived and available through the National Space Science Data Center, as is all available THIR digital data. The THIR digital products are processed to final format only on request. Users should refer to Section 4 of this catalog, and to Sections 1.7 and 2.4 of The Nimbus 6 User's Guide for a discussion of the formats and procedure to order these products.

1.3 The High Resolution Infrared Radiation Sounder (HIRS) Experiment

During this reporting period, the HIRS instrumentation system did not operate. The last operational data was obtained during orbit 4697 (27 May) when a subsystem anomaly (Filter Chopper motor failed) caused the subsystem to be turned off as a precautionary move. Subsequent operations after orbit 4697 are to be construed as evaluations of the subsystem anomaly. Valid operational data is not available after the above date (27 May 1976).

1.4 The Scanning Microwave Spectrometer (SCAMS) Experiment

The SCAMS instrument ceased functioning during orbit 4751 (31 May) due to jamming of the scan mechanism. Scan problems as discussed in Volume 5 first developed during orbit 3862 (26 March) when the drive belt for channel 2 (31.65 z) antenna started slipping. The loss of data from channel 2 prevented retrieval of atmospheric water vapor and liquid water during said catalog period; the inversion matrices for atmospheric temperature were redefined to exclude channel 2, and temperature retrievals were continued until 31 May. (Since this last date, various improvements have been made with respect to data retrieval, calibration of oxygen band channel and inversion of H_2O channels. For a current summary of events as relates to SCAMS, see Section 5.3.)

1.5 The Electrically Scanning Microwave Radiometer (ESMR) Experiment

During this reporting period the ESMR experiment was operational through orbit 9091 (20 April). After orbit 9091, the instrument was turned off and will be fully operational after the arrival of the winter solstice over the Northern Hemisphere. Special severe storm coverage will be scheduled as required. Prior to this reporting period the ESMR performance was satisfactory through orbit 6183 (15 September 1976). After orbit 6184 (15 September), the Horizontal channel output went to zero and telemetry information indicates a failure of the Ferrite Dicke switch. There was no effect of data from the Vertical channel. Data are being collected and processed with the EIS display updated to process only the Vertical channel data. See Section 3 for a new table of values and selected ESMR images for this catalog period.

1.6 The Earth Radiation Budget (ERB) Experiment

The Solar and wide-angle Earth-Flux channels continued to operate in the non-scanning mode; however, an Electronics calibration test of the subsystem was performed followed by a positioning of the scanhead in the shortwave position during orbit 8740 (25 March). This maneuver is the first such movement of the scanhead since orbit 2878 (12 January 1976) when the scanhead was stowed in the longwave check position due to mechanical scan problems. Since orbit 8754 (26 March) the scanhead is once again operating in the nadir position. Data quality is good and the ERB sensor is operating full-time as power permits.

1.7 The Limb Radiance Inversion Radiometer (LRIR) Experiment

The last useable data from the LRIR was received during orbit 2801 (7 January). By this orbit the methane used to cool the detector was depleted and the telemetry indicating the detector temperature was saturated at 73.6°K. The ammonia temperature was constant until orbit 2787 (6 January) when it began to increase and then became erratic-varying from 145.6°K to 150.0°K. At orbit 2802 (7 January) the temperature of 145.6°K began increasing and by orbit 2806 it was at 165.7°K, when the LRIR was turned off. Since the above date, the experiment has been turned on during several occasions to record the ammonia temperature. The last reading, orbit 5014 (20 June) indicated that the cryogen shield temperature reached telemetry saturation at 263°K. With all of the coolants (methane-ammonia) depleted and useable experiment data non-existent; the LRIR is expected to be in a permanent non-operational mode even though the instrument and telemetry are completely functional.

1.8 The Pressure Modulator Radiometer (PMR) Experiment

During this catalog period the PMR subsystem was operational during the entire reporting schedule. Data quality from both channels was satisfactory. All acquired data was routinely transmitted from GSFC to the experimenter at Oxford, England.

1.9 The Tropical Wind Energy Conversion and Reference Level Experiment (TWERLE)/Random Access Measurement System (RAMS)

With the successful conclusion of the TWERLE Experiment, data transmission to the National Center for Atmospheric Research was terminated on 10 August 1976. A summary report detailing various aspects of the experiment has been published and may be found in the following publication authored by: Julian, P., Massnon, M., Levanson, N.: The TWERLE Experiment, Bulletin of the American Meteorological Society, Vol. 58, No. 9, September 1977, pp. 936-948.

The TWERLE Experiment was a significant part of the work load of the Random Access Measurement Subsystem (RAMS). However, the RAMS continues to be used to track and monitor various experiment platforms. During this catalog period, the RAMS subsystem continues to track the "oil spill" in the Atlantic Ocean from the Argo Merchant Tanker that ran aground along the New England coast during a severe winter storm.

As of 12 June 1976, (Nimbus 6 one year anniversary) over 700 platforms had been activated. Table 1-3 shows distribution of these platforms. The full address of each experimenter is given in Table 9-2 in the Nimbus 6 User's Guide. (Corrected addresses for many of these experimenters, and addresses for several new experimenters, are given in Section 5.8 of this catalog.) Anyone interested in results from a particular experiment should write to the principal investigator for that experiment.

1.10 The Tracking and Data Relay Experiment (T&DRE)

During this catalog period the T&DRE sibsystem was not powered. The subsystem anomaly (see Data Catalog, Volume 9, Section 1.10) previously reported continues to effect the T&DRE operations. Specifically, the lower (Y) gimbal aligned along the spacecraft pitch axis remains locked at plus 36 degrees. Significant accomplishments of the T&DRE are discussed in Data Catalog Volume 1, Section 1.10.

Table 1-3

TWERLE Platform Activity as of 12 June 1976

Principal Investigator	Platform			
	Type	Active	Inactive	Total
Dr. Paul R. Julian Boulder, Colorado	Balloons	81	275	356
Professor Norbert Untersteiner Seattle, Washington	Ice Buoys	26	6	32
Dr. Hanson Miami, Florida	Drifting Buoys	12	33	45

Table 1-3 (continued)

Principal Investigator	Platform			
	Type	Active	Inactive	Total
Mr. Vincent Lally Boulder, Colorado	Balloons	0	21	21
Dr. P. Richardson Woods Hole, Massachusetts	Drifting Buoys	0	1	1
Mr. Arnold Gordon Palisades, New York	Drifting Buoys	4	20	24
Mr. Tim P. Barnett La Jolla, California	Drifting Buoys	3	13	16
Mr. Robert Kee Washington, D. C.	Drifting Buoys	0	2	2
Mr. R. E. Vockeroth Ontario, Canada	Buoys	2	0	2
Mr. Jack Lentfer Anchorage, Alaska	Polar Bears	1	1	2
Mr. B. M. Buck Santa Barbara, California	Drifting Buoys	3	2	5
Mr. Fernando De Mendonca Sao Paulo, Brazil	Buoys	0	2	2
Mr. George Cresswell Cronulla, Australia	Drifting Buoys	9	5	14
Dr. A. Dyer Mordialloc, Australia	Drifting Buoys	0	3	3
Professor Lacombe Paris, France	Drifting Buoys	1	4	5
Mr. C. K. Jenson/J. Nordo Oslo, Norway	Buoys	2	0	2
Mr. T. Haegh/T. Vinje Oslo, Norway	Ice Buoys	5	5	10
Mr. Frank Anderson Congella, South Africa	Drifting Buoys	5	5	10
Professor H. Stommel Cambridge, Massachusetts	Drifting Buoys	0	6	6
Dr. A. D. Kirwan, Jr. College Station, Texas	Drifting Buoys	0	12	12

Table 1-3 (continued)

Principal Investigator	Platform			
	Type	Active	Inactive	Total
Mr. H. N. Brann Melbourne, Australia	Drifting Buoys	1	5	6
Professor Morel Paris, France	Balloons & Buoys	0	47	47
Dr. John Garrett Victoria, B. C. Canada	Drifting Buoys	2	33	35
Professor Tchernia Paris, France	Dirfting Buoys	3	2	5
Mr. R. R. Dickson Lowestoft, Suffolk, U. K.	Drifting Buoys	1	5	6
Dr. Michael Hall Bay St. Louis, Mississippi	Buoys	9	10	19
Mr. David Thomas, Jr. Hampton, Virginia	Buoys	0	6	6
Dr. J. Williamson La Jolla, California	Balloons	0	1	1
Mr. J. C. O'Rourke Calgary, Canada	Buoys	2	0	2
Mr. Robert Oehlkers Madison, Wisconsin	Buoys	2	8	10
Capt. E. A. Delaney Washington, D. C.	Buoys	1	0	1
Dr. R. H. Goodman Alberta, Canada	Buoys	1	1	2
Dr. D. Halpern Seattle, Washington	Buoys	2	1	3
TOTALS		178	535	713

SECTION 2
THE ORBITAL ELEMENTS AND DATA AVAILABILITY ON-OFF TIMES

This section presents the Nimbus orbital elements for selected epochs, tabulates the time when each of the experiments was recording data, and gives procedures for determining the time and orbit when the satellite is over a given geographical area (and thus determining the location of coverage for each experiment).

The Nimbus 6 Brouwer Mean Orbital elements for selected epochs during January and February 1977 are listed in Table 2-1.

As previous elements indicated, the orbital period was slowly increasing (approximately 22 milliseconds per day) and the satellite was moving into a slightly higher orbit. This effect was attributed to the thrust given by the solid methane and ammonia sublimating from the LRIR solid cooler. Since 26 May 1976, the orbital period appears to have stabilized and has remained constant at 107.417 minutes. Thus with the depletion of the solid methane and ammonia now complete; the predicted (Vol. 4, Sec. 2)

Table 2-1

Nimbus 6 Brouwer Mean Orbital Elements for
March and April 1977

Epoch	GMT	14 March 77 00 00 00	25 March 77 00 00 00	11 April 77 00 00 00	22 April 77 00 00 00
Semi-Major Axis	Km	7485.332	7485.335	7485.327	7485.326
Eccentricity		.000854	.000854	.000844	.000816
Inclination	Degrees	110.465	99.951	99.948	99.948
Argument of Perigee	Degrees	137.715	113.035	74.911	49.935
Right Ascension of Ascending Node	Degrees	345.820	356.607	13.279	24.066
Height of Perigee	Km	1100.77	1100.70	1100.84	1101.06
Height of Apogee	Km	1113.56	1113.64	1113.48	1113.26
Anomalistic Period	Minutes	107.41726	107.41732	107.41715	107.41713
Motion of Perigee	Deg. per Day	-2.4201	-2.4200	-2.4202	-2.4202

stabilization of the orbital period by mid-1976 has been confirmed. The elements listed in Table 2-1 do not account for this affect. When these elements are used more than seven days from epoch, location errors of greater than 60 km (about ten seconds of time), can be expected. If more accurate ephemeris are needed for a specific time period, write to the Nimbus Project, Code 430, Goddard Space Flight Center, Greenbelt, Maryland 20771.

The data availability on-off times, listed in Table 2-2, are the times when the data from each experiment was recorded on a HDRSS and processed through the Meteorological Data Handling System (MDHS) at Goddard Space Flight Center. The Table 2-2 header labels and their meaning are as follows:

- INT ORBIT AND STDN

  The satellite orbit number in progress when the satellite data is relayed to a ground station is called the interrogation orbit (INT ORBIT). The ground stations receiving the Nimbus 6 satellite data are part of the Spacecraft and Tracking Data Network (STDN). There are four STDN stations receiving Nimbus 6 experiment data: Fairbanks, Alaska (denoted by the letter "A"); Rosman, North Carolina (R); Orroral, Australia (O); and Winkfield, England (W).

- HDRS

  The HDRS (High Data Rate Storage System - HDRSS) is the acronym for the satellite tape recorder system. Recorder "A" or "B" (or both) is played back during each STDN station interrogation.

- HDRSS TIME ON-OFF

  The HDRSS ON and OFF times are given in GMT to the nearest minute. The ON time is the time the (A and B) HDRSS begins recording experiment measurements; the OFF time is when it stops recording. Usually, the ON and OFF times occur when the satellite is within acquisition range on one of the four STDN stations. The time span between each ON and OFF usually covers part of two DATA ORBITS.

- LRIR, THIR, TDRE, SCAM, ESMR, ERB, PMR, TWRL, HIRS

  These are the acronyms for each of the experiments on Nimbus 6. (Acronyms longer than four letters have been shortened.) The column beneath each acronym contains a series of "X's" or "blanks." Each "X" in the column indicates that the data for that experiment was processed at GSFC. A "blank" usually indicates that the experiment was turned off for the HDRSS ON-OFF in that line. A single "blank" in the middle of a series of "X's" frequently means that the experiment was on during that time span but the data has not been processed, or is unavailable for any of several reasons.

- DATA ORBIT

  A DATA ORBIT begins when the satellite crosses the equator heading in a northbound direction, and ends after the satellite has circled the earth and is about to cross the equator heading in a northbound direction. The DATA ORBIT number increases by one with each successive northbound equator crossing. The ASCENDING NODE and DESCENDING NODE information is referenced to the DATA ORBIT number.

- ASCENDING NODE TIME (and) LONG

  The ASCENDING NODE is the point in the orbit when the satellite crosses the equator heading in a northbound direction. The TIME of ASCENDING NODE is given in hours (HR), minutes (MN), and seconds (SS) GMT. The longitude (LONG) of ASCENDING NODE is given to the nearest tenth of a degree of east (E) or west (W) longitude. For Nimbus 6, the ascending node crossings always occur during the daytime portion of the orbit at approximately 11:45 a.m. local time.

- DESCENDING NODE TIME (and) LONG

  The DESCENDING NODE is the point within a DATA ORBIT when the satellite crosses the equator heading in a southbound direction. The TIME of DESCENDING NODE is given in hours (HR), minutes (MN), and seconds (SS) GMT. The longitude (LONG) of DESCENDING NODE is given to the nearest degree of east (E) or west (W) longitude. The descending node crossings always occur during the nighttime portion of each orbit at approximately 11:45 p.m. local time.

Table 2-2 together with the World Map (Figure 2-1) and the vellum Subsatellite Tracks Overlay attached to the back of this catalog, can be used to determine approximate geographic coverages and times for experiment data that the user may wish to order. The Overlay contains 14 correctly spaced satellite subpoint tracks, which end at the approximate earth day-to-night transitions. The tracks contain time ticks spaced 5 minutes apart, approximately annotated at the edge of the overlay and referenced to the equator.

A Subsatellite Tracks Overlay is correctly oriented with the World Map when the ascending or descending node line (equator) on the overlay coincides with the 0-degree latitude line (equator) of the World Map.

Orbital coverage for all orbits on any day is then determined by placing one of the orbit tracks on the overlay at its appropriate ascending node (for daytime data) or descending node (for nighttime data) longitude. (The nodes for each day are listed in Table 2-2.) The orbit track (or tracks) which covers the area of interest is readily apparent.

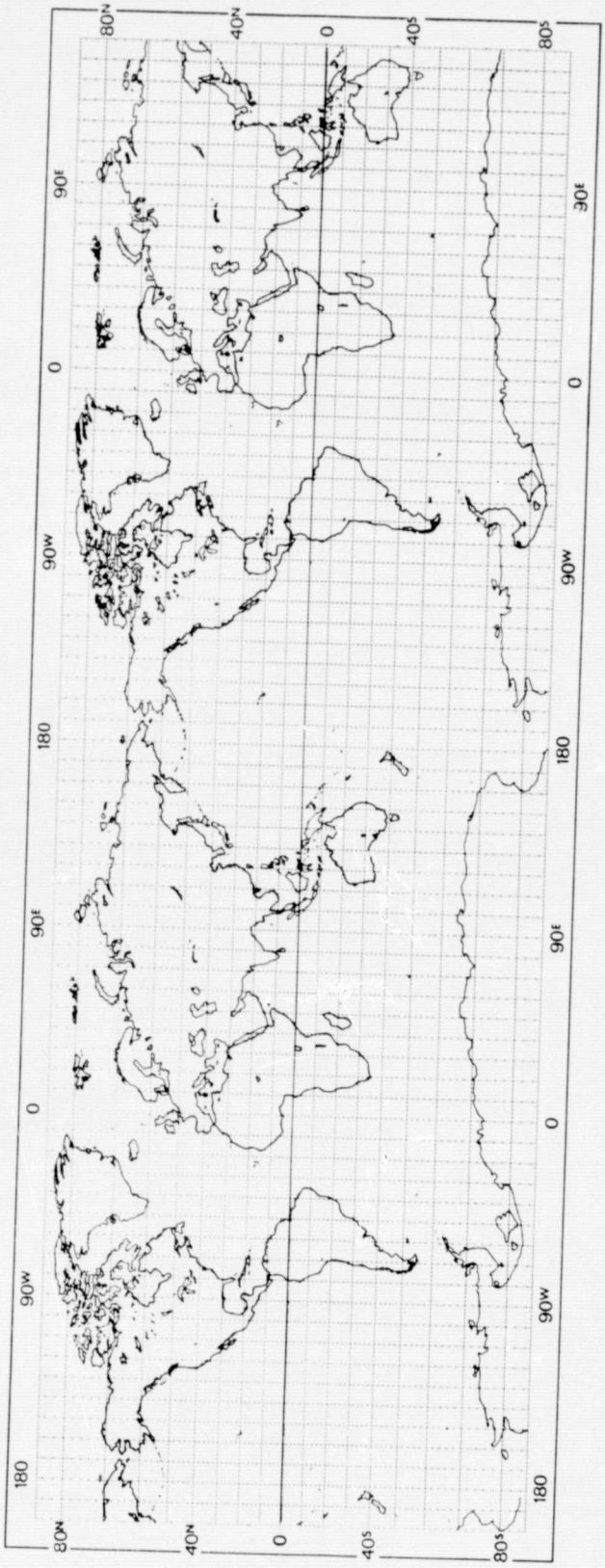


Figure 2-1. World Map

The time (GMT) of satellite passage over an area of interest is calculated by adding or subtracting the minutes from equator crossing (as determined from the overlay) to the appropriate node time (derived from Table 2-2). For daytime orbits, time is added to the ascending node for areas north of the equator, and subtracted from the ascending node for areas south of the equator. For nighttime orbits, time is subtracted from the descending node for areas north of the equator, and added to the descending node for areas south of the equator.

To determine if an experiment was ON during the calculated orbit and time of interest, the user must first "fit" the calculated time into the correct ON-OFF interval of an interrogation orbit listed in Table 2-2. Then the user must check the appropriate experiment column for that line. If an "X" is in the column, the experiment was on and the data has been processed. If the column is "blank", the experiment was off (or the data was not processed) and no data for that orbit is available.

An alternate method of determining geographic coverage and time of data is to use the method described in Section 4. The THIR montages and the vellum Location Guides (attached in the back of this catalog) are used to locate the geographical coverage of each orbit of THIR. The data coverage from other experiments will be within the limits of each THIR swath. The TIME of coverage over a particular area is obtained by using Table 4-1 and adding or subtracting this computed time to the appropriate ascending or descending node time given in Table 2-2.

Each request for data should contain, as a minimum, the name of the experiment for which data is requested, the calendar date of the data, the orbit, the time (GMT) interval of the data needed, and the geographic limits of the area of interest. The procedures described above will provide this information.

The nature and format of the data available from each experiment are explained in detail in the respective sections of The Nimbus 6 User's Guide. The appropriate sources for requesting the various data types are listed in Section 1.7 of the same manual.

TABLE 2-2
DATA AVAILABILITY ON-OFF TIMES
01 MARCH 1977

INT ORBIT AND STTN	HDR STS	HDRSS TIME ON HRMN	HDRSS TIME OFF HRMN	LTHR IRR	TTHD IRF	TSCA MAR	SEMR RB	EPMR RR	TWR LR	THR IS	DATA ORBIT	ASCENDING NODE TIME HRMNSS	ASCENDING NODE LONG DEGREE	DESCENDING NODE TIME HRMNSS	DESCENDING NODE LONG DEGREE
8409C	B	2318	0022				X	X	Y	X	8410	004326	E163.5	013707	W029.9
8410C	B	0037	0141				X	X	Y	X	8411	023058	E136.6	032439	W056.8
8412R	B	0348	0500		X		X	X	Y	X	8412	041829	E109.8	051210	W083.7
8413R	B	0534	0655		X		X	X	Y	X	8413	060601	E082.9	065942	W110.6
8414A	B	0714	0834		X		X	X	Y	X	8414	075333	E056.0	084714	W137.4
8415A	B	0850	1023		X		X	X	Y	X	8415	094105	E029.1	103446	W164.3
8416A	B	1037	1209		X		X	X	Y	X	8416	112836	E002.2	122217	E168.8
8417A	B	1225	1350		X		X	X	Y	X	8417	131608	W024.7	140949	E142.9
8418A	B	1416	1533		X		X	X	Y	X	8418	150340	W051.5	155721	E115.1
8419A	B	1536	1640		X		X	X	Y	X	8419	165112	W078.4	174453	E088.2
8422A	B	1933	2038		X		X	X	Y	X	8420	183843	W105.3	193224	E061.3
8423C	B	2221	2342				X	X	Y	X	8421	202615	W132.2	211956	E034.4
											8422	221347	W159.1	230728	E007.5

TABLE 2-2
DATA AVAILABILITY ON-OFF TIMES
02 MARCH 1977

INT ORBIT AND STTN	HDR STS	HDRSS TIME ON HRMN	HDRSS TIME OFF HRMN	LTHR IRR	TTHD IRF	TSCA MAR	SEMR RB	EPMR RR	TWR LR	THR IS	DATA ORBIT	ASCENDING NODE TIME HRMNSS	ASCENDING NODE LONG DEGREE	DESCENDING NODE TIME HRMNSS	DESCENDING NODE LONG DEGREE
8424C	B	0144	0248				X	X	Y	X	8423	000118	E174.0	005459	W019.4
8425R	B	0325	0426		X		X	X	Y	X	8424	014850	E147.2	024231	W046.3
8426R	B	0452	0615		X		X	X	Y	X	8425	033622	E120.3	043003	W073.1
8427A	B	0633	0750		X		X	X	Y	X	8426	052354	E093.4	061735	W100.0
8428A	B	0820	0941		X		X	X	Y	X	8427	071125	E066.5	080506	W126.9
8429A	B	1005	1126		X		X	X	Y	X	8428	085857	E039.6	095238	W153.8
8430A	B	1152	1313		X		X	X	Y	X	8429	104629	E012.8	114010	E179.3
8431A	B	1330	1457		X		X	X	Y	X	8430	123401	W014.1	132741	E152.5
8432A	B	1455	1641		X		X	X	Y	X	8431	142132	W041.0	151513	E125.6
8433A	B	1650	1826		X		X	X	Y	X	8432	160904	W067.9	170245	E098.7
8434A	B	1825	2012		X		X	X	Y	X	8433	175636	W094.8	185017	E071.8
8435A	B	1956	2114		X		X	X	Y	X	8434	194408	W121.7	203748	E044.9
8436A	B	2143	2301		X		X	X	Y	X	8435	213139	W148.6	222520	E018.0
											8436	231911	W175.4	001252	W008.9

TABLE 2-2
DATA AVAILABILITY ON-OFF TIMES
03 MARCH 1977

INT ORBIT AND STDN	H D R S	HDRSS TIME ON HRMN	HDRSS TIME OFF HRMN	LR I R	TH I R	TDRS E	SCA M	SEM R	EPH R	TWL R	HIR S	ASCENDING NODE DATA ORBIT	ASCENDING NODE TIME HRMNSS	ASCENDING NODE LONG DEGREE	DESCENDING NODE TIME HRMNSS	DESCENDING NODE LONG DEGREE
84360	B	2333	0045				X	X	X	X		8437	010643	E158.7	020024	W035.7
8437C	B	0101	0206				X	X	X	X		8438	025415	E130.8	034755	W062.6
8439R	B	0410	0533		X		X	X	X	X		8439	044146	E103.9	053527	W089.5
8440R	B	0557	0717		X		X	X	X	X		8440	062918	E077.0	072259	W116.4
8441A	B	0737	0859		X		X	X	X	X		8441	081650	E050.2	091031	W143.3
8442A	B	0924	1046		X		X	X	X	X		8442	100421	E023.3	105802	W170.2
8443A	B	1109	1232		X		X	X	X	X		8443	115153	W003.6	124534	E163.0
8444A	B	1309	1416		X		X	X	X	X		8444	133925	W030.5	143306	E136.1
8445A	B	1439	1544		X		X	X	X	X		8445	152657	W057.4	162037	E109.2
8446A	B	1622	1745		X		X	X	X	X		8446	171428	W084.3	180809	E082.3
8447A	B	1808	1931		X		X	X	X	X		8447	190200	W111.1	195541	E055.4
8448A	B	1956	2117		X		X	X	X	X		8448	204932	W138.0	214313	E028.6
8449A	B	2102	2220		X		X	X	X	X		8449	223704	W163.9	233044	E001.7

TABLE 2-2
DATA AVAILABILITY ON-OFF TIMES
04 MARCH 1977

INT ORBIT AND STDN	H D R S	HDRSS TIME ON HRMN	HDRSS TIME OFF HRMN	LR I R	TH I R	TDRS E	SCA M	SEM R	EPH R	TWL R	HIR S	ASCENDING NODE DATA ORBIT	ASCENDING NODE TIME HRMNSS	ASCENDING NODE LONG DEGREE	DESCENDING NODE TIME HRMNSS	DESCENDING NODE LONG DEGREE
8452R	B	0330	0452		X		X	X	X	X		8450	002435	E168.2	011816	W025.2
8453R	B	0516	0621		X		X	X	X	X		8451	021207	E141.3	030548	W052.1
8454A	B	0628	0816		X		X	X	X	X		8452	035939	E114.5	045319	W079.0
8455A	B	0842	1004		X		X	X	X	X		8453	054711	E087.6	064051	W105.9
8456A	B	1028	1151		X		X	X	X	X		8454	073442	E060.7	082823	W132.7
8457A	B	1214	1335		X		X	X	X	X		8455	092214	E033.8	101555	W159.6
8458A	B	1358	1519		X		X	X	X	X		8456	110946	E006.9	120326	E173.5
8459A	B	1542	1704		X		X	X	X	X		8457	125718	W020.0	135058	E146.6
8460A	B	1726	1849		X		X	X	X	X		8458	124449	W046.9	153830	E119.7
8461A	B	1913	2018		X		X	X	X	X		8459	163221	W073.7	172602	E092.9
8462A	B	2100	2222		X		X	X	X	X		8460	181953	W100.6	191333	E066.0
8463A	B	2252	2356		X		X	X	X	X		8461	200724	W127.5	210105	E039.1
												8462	215456	W154.4	224837	E012.2
												8463	234229	E178.7	003608	W014.7

TABLE 2-2
DATA AVAILABILITY ON-OFF TIMES
05 MARCH 1977

INT ORBIT AND STDN	HDRS	HDRSS TIME ON HRMN	OFF HRMN	LR IR R	THR IR R	TDR ER E	SCA MR M	SEM RR R	EPH RR B	TMR RR R	THR WL L	IRR IR S	DATA ORBIT	ASCENDING NODE TIME HRMNSS	LONG DEGREE	DESCENDING NODE TIME HRMNSS	LONG DEGREE
84640	B	0005	0109					X	X	X	X		8464	013000	E151.9	022340	W041.6
8465R	B	0315	0409		X			X	X	X	X		8465	031731	E125.0	041112	W068.5
8466R	B	0434	0557		X			X	X	X	X		8466	050503	E098.1	055844	W095.3
8468A	B	0638	0922		X			X	X	X	X		8467	065235	E071.2	074615	W122.2
8469A	B	0946	1109		X			X	X	X	X		8468	084007	E044.3	093347	W149.1
8470A	B	1132	1255		X			X	X	X	X		8469	102738	E017.4	112119	W176.0
8471A	B	1317	1438		X			X	X	X	X		8470	121510	W009.4	130850	E157.1
8472A	B	1501	1622		X			X	X	X	X		8471	140242	W036.3	145622	E130.3
8473A	B	1645	1808		X			X	X	X	X		8472	155013	W063.2	164354	E103.4
8474A	B	1830	1954		X			X	X	X	X		8473	173745	W090.1	183126	E076.5
8475A	B	2020	2140		X			X	X	X	X		8474	192517	W117.0	201857	E049.6
8476A	B	2208	2326		X			X	X	X	X		8475	211249	W143.9	220629	E022.7
													8476	230020	W170.7	235401	W004.2

TABLE 2-2
DATA AVAILABILITY ON-OFF TIMES
06 MARCH 1977

INT ORBIT AND STDN	HDRS	HDRSS TIME ON HRMN	OFF HRMN	LR IR R	THR IR R	TDR ER E	SCA MR M	SEM RR R	EPH RR B	TMR RR R	THR WL L	IRR IR S	DATA ORBIT	ASCENDING NODE TIME HRMNSS	LONG DEGREE	DESCENDING NODE TIME HRMNSS	LONG DEGREE
84760	B	2322	0025					X	X	X	X		8477	004752	E162.4	014133	W031.0
8477C	B	0041	0144					X	X	X	X		8478	023524	E135.5	032904	W057.9
8479R	B	0352	0514		X			X	X	X	X		8479	042256	E108.6	051636	W084.8
8480R	B	0538	0700		X			X	X	X	X		8480	061027	E081.7	070408	W111.7
8481A	B	0652	0839		X			X	X	X	X		8481	075759	E054.9	085140	W138.6
8482A	B	0855	1028		X			X	X	X	X		8482	094531	E028.0	103911	W165.5
8483A	B	1052	1213		X			X	X	X	X		8483	113303	E001.1	122643	E167.7
8484A	B	1237	1358		X			X	X	X	X		8484	132034	W025.8	141415	E140.8
8485A	B	1421	1541		X			X	X	X	X		8485	150806	W052.7	160146	E113.9
8486A	B	1604	1726		X			X	X	X	X		8486	165538	W079.6	174918	E087.0
8487A	B	1749	1912		X			X	X	X	X		8487	184310	W106.4	193650	E060.1
8488A	B	1937	2058		X			X	X	X	X		8488	203041	W133.3	212422	E033.3
8489A	B	2124	2244		X			X	X	X	X		8489	221813	W160.2	231153	E006.4

TABLE 2-2
DATA AVAILABILITY ON-OFF TIMES
07 MARCH 1977

INT ORBIT AND STDN	HDRS	HDRSS TIME ON	HDRSS TIME OFF	LR IR	THR	TDRF	SCAMR	SEMRB	EPMR	TWRL	HIRS	ASCENDING NODE DATA ORBIT	ASCENDING NODE TIME HRMNSS	ASCENDING NODE LONG DEGREE	DESCENDING NODE TIME HRMNSS	DESCENDING NODE LONG DEGREE
84900	B	0001	0105				X	X	X	X		8490	000545	E172.9	005925	W020.5
84910	B	0155	0251				X	X	X	X		8491	015316	E146.0	024657	W047.4
8492R	B	0328	0431		X		X	X	X	X		8492	034048	E119.1	043429	W074.3
8493R	B	0457	0619		X		X	X	X	X		8493	052820	E092.3	062200	W101.2
8495A	B	0712	0945		X		X	X	X	X		8494	071552	E065.4	080932	W128.0
8496A	B	1009	1132		X		X	X	X	X		8495	090323	E038.5	095704	W154.9
8497A	B	1156	1318		X		X	X	X	X		8496	105055	E011.6	114435	E178.2
8498A	B	1340	1501		X		X	X	X	X		8497	123827	W015.3	133207	E151.3
8499A	B	1524	1645		X		X	X	X	X		8498	142559	W042.2	151939	E124.4
8500A	B	1708	1831		X		X	X	X	X		8499	161330	W069.0	170711	E097.6
8501A	B	1854	2016		X		X	X	X	X		8500	180102	W095.9	185442	E070.7
8502A	B	2041	2203		X		X	X	X	X		8501	194834	W122.8	204214	E043.8
8503A	B	2232	2349		X		X	X	X	X		8502	213606	W149.7	222946	E016.9
												8503	232337	W176.6	001717	W010.0

TABLE 2-2
DATA AVAILABILITY ON-OFF TIMES
08 MARCH 1977

INT ORBIT AND STDN	HDRS	HDRSS TIME ON	HDRSS TIME OFF	LR IR	THR	TDRF	SCAMR	SEMRB	EPMR	TWRL	HIRS	ASCENDING NODE DATA ORBIT	ASCENDING NODE TIME HRMNSS	ASCENDING NODE LONG DEGREE	DESCENDING NODE TIME HRMNSS	DESCENDING NODE LONG DEGREE
85030	B	2345	0047				X	X	X	X		8504	011108	E156.6	020448	W036.9
85040	B	0105	0209				X	X	X	X		8505	025839	E129.7	035220	W063.7
8506R	B	0416	0538		X		X	X	X	X		8506	044611	E102.8	053951	W090.6
8507R	B	0602	0721		X		X	X	X	X		8507	063343	E075.9	072723	W117.5
8508A	B	0732	0902		X		X	X	X	X		8508	082115	E049.0	091455	W144.4
8509A	B	0928	1047		X		X	X	X	X		8509	100846	E022.2	110226	W171.3
8510A	B	1114	1236		X		X	X	X	X		8510	115618	W004.7	124958	E161.9
8511A	B	1300	1420		X		X	X	X	X		8511	134350	W031.6	143730	E135.0
8512A	B	1408	1524		X		X	X	X	X		8512	153122	W058.5	162502	E108.1
8513A	B	1550	1707		X		X	X	X	X		8513	171853	W085.4	181233	E081.2
8514A	B	1734	1853		X		X	X	X	X		8514	190625	W112.3	200005	E054.3
8515A	B	1919	2036		X		X	X	X	X		8515	205357	W139.1	214737	E027.4
8516A	B	2106	2224		X		X	X	X	X		8516	224128	W166.0	233508	E000.6

TABLE 2-2
DATA AVAILABILITY ON-OFF TIMES
09 MARCH 1977

INT ORBIT AND STDN	H D R S	HDRSS TIME ON HRMN	OFF HRMN	L R I R	T H I	T D R F	S C A M	E S M R	E M R B	P M R	T W R L	H I R S	DATA ORBIT	ASCENDING NODE TIME HRMNSS	LONG DEGREE	DESCENDING NODE TIME HRMNSS	LONG DEGREE
85170	B	0024	0128					X	X	X	X		8517	002900	E167.1	012240	W026.3
8518C	B	0210	0314					X	X	X	X		8518	021632	E140.2	031012	W053.2
8519R	B	0353	0438		X			X	X	X	X		8519	040704	E113.3	045744	W080.1
8520R	B	0520	0642		X			X	X	X	X		8520	055135	E086.4	064515	W107.0
8521A	B	0700	0820		X			X	X	X	X		8521	073907	E059.6	083247	W133.9
8522A	B	0932	0935										8522	092639	E032.7	102019	W160.7
8523A	B	1032	1154		X			X	X	X	X		8523	111410	E005.8	120750	E172.4
8524A	B	1218	1340		X			X	X	X	X		8524	130142	W021.1	135522	E145.5
8525A	B	1404	1508		X			X	X	X	X		8525	144914	W048.0	154254	E118.6
8526A	B	1509	1626		X			X	X	X	X		8526	163646	W074.9	173026	E091.7
8527A	B	1653	1812		X			X	X	X	X		8527	182417	W101.7	191757	E064.9
8528A	B	1838	1957		X			X	X	X	X		8528	201149	W128.6	210529	E038.0
8529A	B	2024	2142		X			X	X	X	X		8529	215921	W155.5	225301	E011.1
8530A	B	2216	2329		X			X	X	X	X		8530	234653	E177.6	004032	W015.8

TABLE 2-2
DATA AVAILABILITY ON-OFF TIMES
10 MARCH 1977

INT ORBIT AND STDN	H D R S	HDRSS TIME ON HRMN	OFF HRMN	L R I R	T H I	T D R F	S C A M	E S M R	E M R B	P M R	T W R L	H I R S	DATA ORBIT	ASCENDING NODE TIME HRMNSS	LONG DEGREE	DESCENDING NODE TIME HRMNSS	LONG DEGREE
853CC	B	0010	0113					X	X	X	X		8531	013424	E150.7	022804	W042.7
8531C	B	0129	0234					X	X	X	X		8532	032156	E123.9	041536	W069.6
8532R	B	0309	0358		X			X	X	X	X		8533	050928	E097.0	060308	W096.5
8533R	B	0437	0601		X			X	X	X	X		8534	065659	E070.1	075039	W123.3
8535A	B	0804	0926		X			X	X	X	X		8535	084431	E043.2	093811	W150.2
8536A	B	0952	1114		X			X	X	X	X		8536	103203	E016.3	112543	W177.1
8537A	B	1137	1259		X			X	X	X	X		8537	121935	W010.6	131314	E156.0
8538A	B	1321	1426		X			X	X	X	X		8538	140706	W037.4	150046	E129.1
8539A	B	1429	1546		X			X	X	X	X		8539	155438	W064.3	164818	E102.3
8540A	B	1612	1730		X			X	X	X	X		8540	174210	W091.2	183550	E075.4
8542A	B	1757	1914		X			X	X	X	X		8541	192942	W118.1	202321	E048.5
8543A	B	2134	2246		X			X	X	X	X		8542	211713	W145.0	221053	E021.6
													8543	230445	W171.9	235825	W005.3

TABLE 2-2
DATA AVAILABILITY ON-OFF TIMES
11 MARCH 1977

INT ORBIT AND STDN	H D R S	HDRSS TIME ON HRMN	HDRSS TIME OFF HRMN	L R I R	T H I R	T D F	S C A M	E S M R	E E R B	P M R	T W R L	H I R S	DATA ORBIT	ASCENDING NODE TIME HRMNSS	ASCENDING NODE LONG DEGREE	DESCENDING NODE TIME HRMNSS	DESCENDING NODE LONG DEGREE
8546R	B	0356	0517		X			X	X	X	X		8544	005217	E161.3	014557	W032.2
8547R	B	0544	0702		X			X	X	X	X		8545	023949	E134.4	033328	W059.0
8548A	B	0724	0843		X			X	X	X	X		8446	042720	E107.5	052100	W085.9
8549A	B	0909	1031		X			X	X	X	X		8547	061452	E080.6	070832	W112.8
8555A	B	1056	1218		X			X	X	X	X		8548	080224	E053.7	085603	W139.7
8551A	B	1241	1403		X			X	X	X	X		8549	094955	E026.9	104335	W166.6
8552A	B	1425	1546		X			X	X	X	X		8550	113727	W000.0	123107	E166.6
8553A	B	1608	1712		X			X	X	X	X		8551	132459	W026.9	141839	E139.7
8550A	B	1729	2102		X			X	X	X	X		8552	151231	W053.8	160610	E112.8
8556A	B	2100	2248		X			X	X	X	X		8553	170002	W080.7	175342	E085.9
													8554	184734	W107.6	194114	E059.0
													8555	203506	W134.5	212845	E032.1
													8556	222237	W161.3	231617	E005.3

TABLE 2-2
DATA AVAILABILITY ON-OFF TIMES
12 MARCH 1977

INT ORBIT AND STDN	H D R S	HDRSS TIME ON HRMN	HDRSS TIME OFF HRMN	L R I R	T H I R	T D F	S C A M	E S M R	E E R B	P M R	T W R L	H I R S	DATA ORBIT	ASCENDING NODE TIME HRMNSS	ASCENDING NODE LONG DEGREE	DESCENDING NODE TIME HRMNSS	DESCENDING NODE LONG DEGREE
8557C	B	0005	0110					X	X	X	X		8557	001009	E171.8	010349	W021.6
8558C	B	0152	0256					X	X	X	X		8558	015741	E144.9	025121	W048.5
8560R	B	0337	0442		X			X	X	X	X		8559	034513	E118.0	043852	W075.4
8562A	B	0809	0949		X			X	X	X	X		8560	053244	E091.1	062624	W102.3
8563A	B	1014	1137		X			X	X	X	X		8561	072016	E064.3	081356	W129.2
8564A	B	1200	1322		X			X	X	X	X		8562	090748	E037.4	100127	W156.0
8565A	B	1344	1505		X			X	X	X	X		8563	105520	E010.5	114859	E177.1
8566A	B	1451	1608		X			X	X	X	X		8564	124251	W016.4	133631	E150.2
8567A	B	1634	1753		X			X	X	X	X		8565	143023	W043.3	152403	E123.3
8568A	B	1820	1938		X			X	X	X	X		8566	161755	W070.2	171134	E096.4
8570A	B	2236	2353		X			X	X	X	X		8567	180526	W097.0	185906	E069.6
													8568	195258	W123.9	204638	E042.7
													8569	214030	W150.8	223409	E015.8
													8570	232802	W177.7	002141	W011.1

TABLE 2-2
DATA AVAILABILITY ON-OFF TIMES
13 MARCH 1977

INT ORBIT AND STDN	HDR S	HDRSS TIME ON HRMN	HDRSS TIME OFF HRMN	LR IR	THIR	TDRE	SCAM	ESMR	EBR	PMR	TWRL	HIRS	DATA ORBIT	ASCENDING NODE TIME HRMNSS	ASCENDING NODE LONG DEGREE	DESCENDING NODE TIME HRMNSS	DESCENDING NODE LONG DEGREE
85700	B	2350	0054					X	X	X	X		8571	011536	E155.4	020916	W038.0
85710	B	0109	0214					X	X	X	X		8572	030308	E128.5	035648	W064.9
8572R	B	0250	0354		X			X	X	X	X		8573	045039	E101.7	054419	W091.8
8573R	B	0420	0534		X			X	X	X	X		8574	063812	E074.8	073151	W118.7
8574A	B	0601	0716		X			X	X	X	X		8575	082543	E047.9	091923	W145.5
8575A	B	0746	0902		X			X	X	X	X		8576	101315	E021.0	110655	W172.4
8576A	B	0932	1054		X			X	X	X	X		8577	120047	W005.9	125426	E160.7
8577A	B	1118	1241		X			X	X	X	X		8578	134819	W032.8	144158	E133.8
8578A	B	1304	1425		X			X	X	X	X		8579	153550	W059.6	162930	E106.9
8579A	B	1448	1609		X			X	X	X	X		8580	172322	W086.5	181702	E080.1
8580A	B	1554	1714		X			X	X	X	X		8581	191054	W113.4	200433	E053.2
8581A	B	1738	1856		X			X	X	X	X		8582	205826	W140.3	215205	E026.3
8582A	B	1923	2042		X			X	X	X	X		8583	224557	W167.2	233937	W000.6
8583A	B	2111	2228		X			X	X	X	X						

TABLE 2-2
DATA AVAILABILITY ON-OFF TIMES
14 MARCH 1977

INT ORBIT AND STDN	HDR S	HDRSS TIME ON HRMN	HDRSS TIME OFF HRMN	LR IR	THIR	TDRE	SCAM	ESMR	EBR	PMR	TWRL	HIRS	DATA ORBIT	ASCENDING NODE TIME HRMNSS	ASCENDING NODE LONG DEGREE	DESCENDING NODE TIME HRMNSS	DESCENDING NODE LONG DEGREE
85830	B	2309	0013					X	X	X	X		8584	003329	E166.0	012708	W027.5
85840	B	0026	0129					X	X	X	X		8585	022101	E139.1	031440	W054.4
8586R	B	0340	0500		X			X	X	X	X		8586	040833	E112.2	050212	W081.2
8587R	B	0524	0645		X			X	X	X	X		8587	055604	E085.3	064944	W108.1
8588A	B	0705	0823		X			X	X	X	X		8588	074336	E058.4	083715	W135.0
8589A	B	0850	1012		X			X	X	X	X		8589	093108	E031.5	102447	W161.9
8590A	B	1036	1159		X			X	X	X	X		8590	111839	E004.7	121219	E171.2
8591A	B	1222	1344		X			X	X	X	X		8591	130611	W022.2	135951	E144.4
8592A	B	1408	1528		X			X	X	X	X		8592	145343	W049.1	154722	E117.5
8593A	B	1526	1630		X			X	X	X	X		8593	164115	W076.0	173454	E090.6
8594A	B	1658	1816		X			X	X	X	X		8594	182846	W102.9	192226	E063.7
8595A	B	1845	2001		X			X	X	X	X		8595	201618	W129.8	210958	E036.8
8597A	B	2149	2254		X			X	X	X	X		8596	220350	W156.7	225729	E009.9
													8597	235122	E176.5	004501	W017.0

TABLE 2-2
DATA AVAILABILITY ON-OFF TIMES
15 MARCH 1977

INT ORBIT AND STDN	HDRS DATA RS	HDRSS TIME ON HRMN	HDRSS TIME OFF HRMN	LIR	THR	TDRF	SCAM	SEMR	EBR	PMR	TWRL	HIRS	DATA ORBIT	ASCENDING NODE TIME HRMNSS	ASCENDING NODE LONG DEGREE	DESCENDING NODE TIME HRMNSS	DESCENDING NODE LONG DEGREE
8597C	B	0013	0118					X	X	X	X		8598	013853	E149.6	023233	W043.8
8598C	B	0134	0238					X	X	X	X		8599	032625	E122.7	042004	W070.7
8601A	B	0624	0741		X			X	X	X	X		8600	051357	E095.8	060736	W097.6
8602A	B	0809	0930		X			X	X	X	X		8601	070129	E068.9	075508	W124.5
8603A	B	0956	1117		X			X	X	X	X		8602	084900	E042.1	094240	W151.4
8604A	B	1141	1301		X			X	X	X	X		8603	103632	E015.2	113011	W178.2
8605A	B	1326	1446		X			X	X	X	X		8604	122404	W011.7	131743	E154.9
8606A	B	1509	1631		X			X	X	X	X		8605	141136	W038.6	150515	E128.0
8607A	B	1654	1816		X			X	X	X	X		8606	155907	W065.5	165247	E101.1
8608A	B	1840	2002		X			X	X	X	X		8607	174639	W092.4	184018	E074.2
8609A	B	2028	2148		X			X	X	X	X		8608	193411	W119.2	202750	E047.4
8610A	B	2216	2335		X			X	X	X	X		8609	212143	W146.1	221522	E020.5
													8610	230914	W173.0	000254	W006.4

TABLE 2-2
DATA AVAILABILITY ON-OFF TIMES
16 MARCH 1977

INT ORBIT AND STDN	HDRS DATA RS	HDRSS TIME ON HRMN	HDRSS TIME OFF HRMN	LIR	THR	TDRF	SCAM	SEMR	EBR	PMR	TWRL	HIRS	DATA ORBIT	ASCENDING NODE TIME HRMNSS	ASCENDING NODE LONG DEGREE	DESCENDING NODE TIME HRMNSS	DESCENDING NODE LONG DEGREE
8611O	B	2331	0334					X	X	X	X		8611	005646	E160.1	015025	W033.3
8614R	B	0548	0708		X			X	X	X	X		8612	024418	E133.2	033757	W060.2
8615A	B	0728	0848		X			X	X	X	X		8613	043150	E106.4	052529	W087.1
8616A	B	0913	1036		X			X	X	X	X		8614	061921	E079.5	071300	W114.0
8617A	B	1100	1218		X			X	X	X	X		8615	080653	E052.6	090032	W140.8
8618A	B	1245	1406		X			X	X	X	X		8616	095425	E025.7	104804	W167.7
8619A	B	1429	1550		X			X	X	X	X		8617	114156	W001.2	123536	E165.4
8620A	B	1613	1734		X			X	X	X	X		8618	132928	W028.1	142307	E138.5
8621A	B	1758	1921		X			X	X	X	X		8619	151700	W055.0	161039	E111.6
8622A	B	1946	2107		X			X	X	X	X		8620	170432	W081.8	175811	E084.8
													8621	185203	W108.7	194543	E057.9
													8622	203935	W135.6	213314	E031.0
													8623	222707	W162.5	232046	E004.1

TABLE 2-2
DATA AVAILABILITY ON-OFF TIMES
17 MARCH 1977

INT ORBIT AND STDN	HDRS	HDRSS TIME ON	HDRSS TIME OFF	LR	THR	TDRF	TSAM	ESR	ESB	EPR	TWR	THR	DATA ORBIT	ASCENDING NODE TIME HRMNSS	ASCENDING NODE LONG DEGREE	DESCENDING NODE TIME HRMNSS	DESCENDING NODE LONG DEGREE
86240	B	0010	0114					X	X	X	X		8624	001439	E170.6	010818	W022.8
86250	B	0156	0301					X	X	X	X		8625	020210	E143.8	025550	W049.7
8626R	B	0341	0440		X			X	X	X	X		8626	034942	E116.9	044321	W076.5
8627R	B	0510	0621		X			X	X	X	X		8627	053714	E090.0	063053	W103.4
8628A	B	0646	0805		X			X	X	X	X		8628	072446	E063.1	081825	W130.3
8629A	B	0832	0946		X			X	X	X	X		8629	091217	E036.2	100556	W157.2
8630A	B	1018	1141		X			X	X	X	X		8630	105949	E009.3	115328	E175.9
8631A	B	1204	1326		X			X	X	X	X		8631	124721	W017.5	134100	E149.1
8632A	B	1351	1509		X			X	X	X	X		8632	143453	W044.4	152832	E122.2
8633A	B	1532	1652		X			X	X	X	X		8633	162224	W071.3	171603	E095.3
8634A	B	1717	1839		X			X	X	X	X		8634	180956	W098.2	190335	E068.4
8635A	B	1904	2026		X			X	X	X	X		8635	195728	W125.1	205107	E041.5
8637A	B	2241	2358		X			X	X	X	X		8636	214500	W152.0	223839	E014.6
													8637	233231	W178.8	002610	W012.3

TABLE 2-2
DATA AVAILABILITY ON-OFF TIMES
18 MARCH 1977

INT ORBIT AND STDN	HDRS	HDRSS TIME ON	HDRSS TIME OFF	LR	THR	TDRF	TSAM	ESR	ESB	EPR	TWR	THR	DATA ORBIT	ASCENDING NODE TIME HRMNSS	ASCENDING NODE LONG DEGREE	DESCENDING NODE TIME HRMNSS	DESCENDING NODE LONG DEGREE
8639R	B	0241	0357		X			X	X	X	X		8638	012003	E154.3	021342	W039.1
8640R	B	0424	0546		X			X	X	X	X		8639	030735	E127.4	040114	W066.0
8641A	B	0605	0721		X			X	X	X	X		8640	045506	E100.5	054846	W092.9
8642A	B	0750	0911		X			X	X	X	X		8641	064238	E073.6	073617	W119.8
8643A	B	0936	1059		X			X	X	X	X		8642	083010	E046.8	092349	W146.7
8644A	B	1122	1245		X			X	X	X	X		8643	101742	E019.9	111121	W173.6
8645A	B	1308	1428		X			X	X	X	X		8644	120513	W007.0	125852	E159.6
8646A	B	1452	1613		X			X	X	X	X		8645	135245	W033.9	144624	E132.7
8647A	B	1636	1758		X			X	X	X	X		8646	154017	W060.8	163356	E105.8
8648A	B	1828	1944		X			X	X	X	X		8647	172749	W087.7	182128	E078.9
8649A	B	2009	2130		X			X	X	X	X		8648	191520	W114.5	200859	E052.0
8650A	B	2156	2316		X			X	X	X	X		8649	210252	W141.4	215631	E025.2
													8650	225024	W168.3	234403	W001.7

TABLE 2-2
DATA AVAILABILITY ON-OFF TIMES
19 MARCH 1977

INT ORBIT AND STDN	HDR S	HDRSS TIME ON HRMN	HDRSS TIME OFF HRMN	LR IR	TH IR	TD RE	SC AM	SE MR	EM RB	EP MR	TW RL	HR IS	DATA ORBIT	ASCENDING NODE TIME HRMNSS	ASCENDING NODE LONG DEGREE	DESCENDING NODE TIME HRMNSS	DESCENDING NODE LONG DEGREE
86510	B	0031	0133					X	X	X	X		8651	003756	E164.8	013135	W028.6
8653R	B	0344	0502		X			X	X	X	X		8652	022527	E137.9	031906	W055.5
8654R	B	0529	0650		X			X	X	X	X		8653	041259	E111.0	050638	W082.4
8655A	B	0709	0829		X			X	X	X	X		8654	060031	E084.2	065410	W109.3
8656A	B	0856	1015		X			X	X	X	X		8655	074803	E057.3	084142	W136.1
8657A	B	1041	1202		X			X	X	X	X		8656	093534	E030.4	102913	W163.0
8658A	B	1228	1348		X			X	X	X	X		8657	112306	E003.5	121645	E170.1
8659A	B	1412	1532		X			X	X	X	X		8658	131038	W023.4	140417	E143.2
8660A	B	1554	1717		X			X	X	X	X		8659	145810	W050.3	155148	E116.3
8661A	B	1740	1844		X			X	X	X	X		8660	164541	W077.1	173920	E089.5
8662A	B	1928	2049		X			X	X	X	X		8661	183313	W104.0	192652	E062.6
8664A	B	2306	0018		X			X	X	X	X		8662	202045	W130.9	211424	E035.7
													8663	220816	W157.8	230155	E008.8
													8664	235548	E175.3	004927	W018.1

TABLE 2-2
DATA AVAILABILITY ON-OFF TIMES
20 MARCH 1977

INT ORBIT AND STDN	HDR S	HDRSS TIME ON HRMN	HDRSS TIME OFF HRMN	LR IR	TH IR	TD RE	SC AM	SE MR	EM RB	EP MR	TW RL	HR IS	DATA ORBIT	ASCENDING NODE TIME HRMNSS	ASCENDING NODE LONG DEGREE	DESCENDING NODE TIME HRMNSS	DESCENDING NODE LONG DEGREE
86640	B	0018	0121					X	X	X	X		8665	014318	E148.5	023657	W045.0
86650	B	0138	0241					X	X	X	X		8666	033050	E121.6	042429	W071.8
8666R	B	0319	0422		X			X	X	X	X		8667	051822	E094.7	061201	W098.7
8667R	B	0448	0610		X			X	X	X	X		8668	070554	E067.8	075932	W125.6
8668A	B	0628	0744		X			X	X	X	X		8669	085325	E040.9	094704	W152.5
8669A	B	0813	0935		X			X	X	X	X		8670	104057	E014.1	113436	W179.4
8670A	B	1000	1121		X			X	X	X	X		8671	122829	W012.9	132208	E153.8
8671A	B	1145	1308		X			X	X	X	X		8672	141601	W039.7	150939	E126.9
8672A	B	1330	1451		X			X	X	X	X		8673	160332	W066.6	165711	E100.0
8673A	B	1514	1635		X			X	X	X	X		8674	175104	W093.5	184443	E073.1
8674A	B	1658	1821		X			X	X	X	X		8675	193836	W120.4	203215	E046.2
8675A	B	1844	2007		X			X	X	X	X		8676	212607	W147.2	221946	E019.3
8676A	B	2032	2153		X			X	X	X	X		8677	231339	W174.1	000718	W007.5
8677A	B	2221	2339		X			X	X	X	X						

TABLE 2-2
DATA AVAILABILITY ON-OFF TIMES
21 MARCH 1977

INT ORBIT AND STDN	HDRS DATA	HDRSS TIME ON	HDRSS TIME OFF	LR	TH	TDRS	CA	ESMR	ESR	EPM	TWR	THR	ASCENDING NODE DATA ORBIT	ASCENDING NODE TIME HRMNSS	ASCENDING NODE LONG DEGREE	DESCENDING NODE TIME HRMNSS	DESCENDING NODE LONG DEGREE
8677C	B	2334	0038					X	X	Y	X		8678	010111	E159.0	015450	W034.4
8678C	B	0054	0158					X	X	Y	X		8679	024843	E132.1	034221	W061.3
8679R	B	0405	0526		X			X	X	Y	X		8680	043614	E105.2	052953	W088.2
8681R	B	0552	0712		X			X	X	Y	X		8681	062346	E078.4	071725	W115.1
8682A	B	0732	0850		X			X	X	Y	X		8682	081118	E051.5	090457	W141.9
8683A	B	0918	1037		X			X	X	Y	X		8683	095850	E024.6	105228	W168.8
8684A	B	1104	1222		X			X	X	Y	X		8684	114621	W002.3	124000	E164.3
8685A	B	1250	1408		X			X	X	Y	X		8685	133353	W029.2	142732	E137.4
8686A	B	1433	1553		X			X	X	Y	X		8686	152125	W056.1	161504	E110.5
8687A	B	1617	1732		X			X	X	Y	X		8687	170857	W083.0	180235	E083.7
8688A	B	1802	1917		X			X	X	Y	X		8688	185628	W109.8	195007	E056.8
8690A	B	2137	2255		X			X	X	Y	X		8689	204400	W136.7	213739	E029.9
													8690	223132	W163.6	232510	E003.0

TABLE 2-2
DATA AVAILABILITY ON-OFF TIMES
22 MARCH 1977

INT ORBIT AND STDN	HDRS DATA	HDRSS TIME ON	HDRSS TIME OFF	LR	TH	TDRS	CA	ESMR	ESR	EPM	TWR	THR	ASCENDING NODE DATA ORBIT	ASCENDING NODE TIME HRMNSS	ASCENDING NODE LONG DEGREE	DESCENDING NODE TIME HRMNSS	DESCENDING NODE LONG DEGREE
8691O	B	0014	0118					X	X	Y	X		8691	001903	E169.5	011242	W023.9
8692O	B	0201	0305					X	X	Y	X		8692	020635	E142.7	030014	W050.8
8693R	B	0341	0445		X			X	X	Y	X		8693	035407	E115.8	044746	W077.7
8694R	B	0510	0632		X			X	X	Y	X		8694	054139	E088.9	063517	W104.5
8695A	B	0652	0809		X			X	X	Y	X		8695	072910	E062.0	082249	W131.4
8696A	B	0836	0957		X			X	X	Y	X		8696	091642	E035.1	101021	W158.3
8697A	B	1022	1145		X			X	X	Y	X		8697	110414	E008.2	115753	E174.8
8698A	B	1208	1330		X			X	X	Y	X		8698	125146	W018.7	134524	E147.9
8699A	B	1353	1513		X			X	X	Y	X		8699	143917	W045.5	153256	E121.1
8700A	B	1536	1658		X			X	X	Y	X		8700	162649	W072.4	172028	E094.2
8701A	B	1721	1844		X			X	X	Y	X		8701	181421	W099.3	190759	E067.3
8702A	B	1908	2025		X			X	X	Y	X		8702	200153	W126.2	205531	E040.4
8703A	B	2056	2216		X			X	X	Y	X		8703	214924	W153.1	224303	E013.5
8704A	B	2242	0001		X			X	X	Y	X		8704	233656	W180 .0	003035	W013.4

TABLE 2-2
DATA AVAILABILITY ON-OFF TIMES
23 MARCH 1977

INT ORBIT AND STDN	HDR	HDRSS TIME ON	HDRSS TIME OFF	LHIR	THRE	TDRA	SCAM	EMRB	SRMR	EPMR	TWRL	HIRS	DATA ORBIT	ASCENDING NODE TIME HRMNSS	ASCENDING NODE LONG DEGREE	DESCENDING NODE TIME HRMNSS	DESCENDING NODE LONG DEGREE
87040	B	0000	0102				X	X	X	X			8705	012428	E153.2	021806	W040.3
8705C	B	0114	0220				X	X	X	X			8706	031159	E126.3	040538	W067.1
8706R	B	0300	0401		X		X	X	X	X			8707	045931	E099.4	055310	W094.0
8707R	B	0428	0550		X		X	X	X	X			8708	064703	E072.5	074042	W120.9
8708R	B	0617	0732		X		X	X	X	X			8709	083435	E045.6	092813	W147.8
8709A	B	0800	0910		X		X	X	X	X			8710	102206	E018.8	111545	W174.7
8710A	B	0941	1055		X		X	X	X	X			8711	120938	W008.1	130317	E158.5
8711A	B	1128	1240		X		X	X	X	X			8712	135710	W035.0	145048	E131.6
8712A	B	1312	1426		X		X	X	X	X			8713	154442	W061.9	163820	E104.7
8713A	B	1457	1559		X		X	X	X	X			8714	173213	W088.8	182552	E077.8
8714R	B	1628	1749		X		X	X	X	X			8715	191945	W115.7	201324	E050.9
8716A	B	2013	2125		X		X	X	X	X			8716	210717	W142.5	220055	E024.1
8717A	B	2202	2316		X		X	X	X	X			8717	225449	W169.4	234827	W002.8

TABLE 2-2
DATA AVAILABILITY ON-OFF TIMES
24 MARCH 1977

INT ORBIT AND STDN	HDR	HDRSS TIME ON	HDRSS TIME OFF	LHIR	THRE	TDRA	SCAM	EMRB	SRMR	EPMR	TWRL	HIRS	DATA ORBIT	ASCENDING NODE TIME HRMNSS	ASCENDING NODE LONG DEGREE	DESCENDING NODE TIME HRMNSS	DESCENDING NODE LONG DEGREE
87170	B	2316	0021				X	X	X	X			8718	004220	E163.7	013559	W029.7
87180	B	0034	0138				X	X	X	X			8719	022952	E136.8	032331	W056.6
8720R	B	0348	0508		X		X	X	X	X			8720	041724	E109.9	051102	W083.5
8721R	B	0533	0654		X		X	X	X	X			8721	060455	E083.0	065834	W110.4
8722A	B	0713	0827		X		X	X	X	X			8722	075227	E056.2	084606	W137.3
8723A	B	0900	1021		X		X	X	X	X			8723	093959	E029.3	103337	W164.1
8724A	B	1045	1209		X		X	X	X	X			8724	112731	E002.4	122109	E169.0
8725A	B	1232	1353		X		X	X	X	X			8725	131502	W024.5	140841	E142.1
8726A	B	1416	1520		X		X	X	X	X			8726	150234	W051.4	155613	E115.2
8727A	B	1600	1721		X		X	X	X	X			8727	165006	W078.3	174344	E088.3
8728A	B	1744	1906		X		X	X	X	X			8728	183738	W105.1	193116	E061.5
8729A	B	1932	2044		X		X	X	X	X			8729	202509	W132.0	211848	E034.6
8730A	B	2119	2235		X		X	X	X	X			8730	221241	W158.9	230620	E007.7

TABLE 2-2
DATA AVAILABILITY ON-OFF TIMES
25 MARCH 1977

INT ORBIT AND STDN	H D R S	HDRSS TIME ON HRMN	HDRSS TIME OFF HRMN	L R I R	T H I R	T D R E	S C A M	E S M R	E R B	P M R	T W R L	H I R S	DATA ORBIT	ASCENDING NODE TIME HRMNSS	ASCENDING NODE LONG DEGREE	DESCENDING NODE TIME HRMNSS	DESCENDING NODE LONG DEGREE
8733R	B	0308	0427					X	X	X	X		8731	000013	E174.2	005351	W019.2
8734R	B	0452	0614					X	X	X	X		8732	014745	E147.3	024123	W046.1
8735A	B	0632	0737		X			X	X	X	X		8733	033516	E120.5	042855	W073.0
8736A	B	0826	0922		X			X	X	X	X		8734	052248	E093.6	061627	W099.8
8737A	B	1004	1109		X			X	X	X	X		8735	071020	E066.7	080358	W126.7
8738A	B	1150	1312		X			X	X	X	X		8736	085751	E039.8	095130	W153.6
8739A	B	1334	1456		X			X	X	X	X		8737	104527	E012.9	113902	E179.5
8740A	B	1457	1640		X			X	X	X	X		8738	123255	W014.0	132633	E152.6
8741R	B	1652	1809		X			X	X	X	X		8739	142024	W040.8	151405	E125.8
8743A	B	2036	2157		X			X	X	X	X		8740	160758	W067.7	170137	E098.9
8744A	B	2225	2342		X			X	X	X	X		8741	175530	W094.6	184909	E072.0
													8742	194302	W121.5	203640	E045.1
													8743	213034	W148.4	222412	E018.2
													8744	231805	W175.3	001144	W008.7

TABLE 2-2
DATA AVAILABILITY ON-OFF TIMES
26 MARCH 1977

INT ORBIT AND STDN	H D R S	HDRSS TIME ON HRMN	HDRSS TIME OFF HRMN	L R I R	T H I R	T D R E	S C A M	E S M R	E R B	P M R	T W R L	H I R S	DATA ORBIT	ASCENDING NODE TIME HRMNSS	ASCENDING NODE LONG DEGREE	DESCENDING NODE TIME HRMNSS	DESCENDING NODE LONG DEGREE
8744O	B	2342	0042					X	X	X	X		8745	010537	E157.9	015916	W035.5
8745O	B	0059	0202					X	X	X	X		8746	025309	E131.0	034647	W062.4
8747R	B	0409	0531		X			X	X	X	X		8747	044040	E104.1	053419	W089.3
8748R	B	0556	0716		X			X	X	X	X		8748	062812	E077.2	072151	W116.2
8749A	B	0736	0858		X			X	X	X	X		8749	081544	E050.3	090922	W143.1
8750A	B	0922	1046		X			X	X	X	X		8750	100316	E023.5	105654	W170.0
8751A	B	1108	1229		X			X	X	X	X		8751	115047	W003.4	124426	E163.2
8752A	B	1254	1409		X			X	X	X	X		8752	133819	W030.3	143158	E136.3
8753A	B	1438	1559		X			X	X	X	X		8753	152551	W057.2	161929	E109.4
8754A	B	1621	1743		X			X	X	X	X		8754	171323	W084.1	180701	E082.5
8756A	B	1956	2107		X			X	X	X	X		8755	190054	W111.0	195433	E055.6
8757A	B	2141	2301		X			X	X	X	X		8756	204826	W137.9	214205	E028.8
													8757	223558	W164.7	232936	E001.9

TABLE 2-2
DATA AVAILABILITY ON-OFF TIMES
27 MARCH 1977

INT ORBIT AND STDN	HDRS DATA RECORDER	HDRSS TIME ON	HDRSS TIME OFF	LR IR	THR IR	TDRE	SCAM	SEMR	EB	PR	TWR L	THIR S	DATA ORBIT	ASCENDING NODE TIME HRMNSS	ASCENDING NODE LONG DEGREE	DESCENDING NODE TIME HRMNSS	DESCENDING NODE LONG DEGREE
8758	B	0018	0122					X	X	X	X		8758	002327	E168.4	011706	W025.0
87590	B	0205	0310					X	X	X	X		8759	021059	E141.5	030437	W051.9
8760R	B	0329	0450		X			X	X	X	X		8760	035831	E114.6	045209	W078.8
8761R	B	0454	0558		X			X	X	X	X		8761	054602	E087.7	063941	W105.7
8762A	B	0656	0814		X			X	X	X	X		8762	073334	E060.9	082713	W132.5
8763A	B	0841	1002		X			X	X	X	X		8763	092106	E034.0	101444	W159.4
8764A	B	1025	1150		X			X	X	X	X		8764	110838	E007.1	120216	E173.7
8765A	B	1213	1326		X			X	X	X	X		8765	125609	W019.8	134948	E146.8
8766A	B	1357	1518		X			X	X	X	X		8766	144341	W046.6	153719	E119.9
8767A	B	1540	1702		X			X	X	X	X		8767	163113	W073.5	172451	E093.1
8768R	B	1716	1833		X			X	X	X	X		8768	181845	W100.4	191223	E066.2
8769A	B	1912	2029		X			X	X	X	X		8769	200616	W127.3	205955	E039.3
8770A	B	2057	2220		X			X	X	X	X		8770	215348	W154.2	224726	E012.4
8771A	B	2250	0006		X			X	X	X	X		8771	234120	E178.9	003458	W014.5

TABLE 2-2
DATA AVAILABILITY ON-OFF TIMES
28 MARCH 1977

INT ORBIT AND STDN	HDRS DATA RECORDER	HDRSS TIME ON	HDRSS TIME OFF	LR IR	THR IR	TDRE	SCAM	SEMR	EB	PR	TWR L	THIR S	DATA ORBIT	ASCENDING NODE TIME HRMNSS	ASCENDING NODE LONG DEGREE	DESCENDING NODE TIME HRMNSS	DESCENDING NODE LONG DEGREE
87710	B	0004	0108					X	X	X	X		8772	012851	E152.1	022230	W041.3
87720	B	0124	0224					X	X	X	X		8773	031623	E125.2	041002	W068.2
8773R	B	0304	0407		X			X	X	X	X		8774	050355	E098.3	055733	W095.1
8774R	B	0432	0549		X			X	X	X	X		8775	065127	E071.4	074505	W122.0
8775A	B	0614	0730		X			X	X	X	X		8776	083858	E044.5	093237	W148.9
8776A	B	0800	0920		X			X	X	X	X		8777	102630	E017.6	112008	W175.8
8777A	B	0945	1107		X			X	X	X	X		8778	121402	W009.2	130740	E157.4
8778A	B	1132	1254		X			X	X	X	X		8779	140133	W036.1	145512	E130.5
8779A	B	1316	1432		X			X	X	X	X		8780	154905	W063.0	164244	E103.6
8780A	B	1500	1621		X			X	X	X	X		8781	173637	W089.9	183015	E076.7
8781A	B	1645	1757		X			X	X	X	X		8782	192409	W116.8	201747	E049.8
8782A	B	1829	1941		X			X	X	X	X		8783	211140	W143.6	220519	E023.0
8783A	B	2017	2129		X			X	X	X	X		8784	225912	W170.5	235250	W003.9
8784A	B	2205	2324		X			X	X	X	X						

TABLE 2-2
DATA AVAILABILITY ON-OFF TIMES
29 MARCH 1977

INT ORBIT AND STDN	H D R S	HDRSS TIME ON HRMN	HDRSS TIME OFF HRMN	L R I R	T H I R	T D R E	S C A M	E S M R	E R B	P M R	T W R L	H I R S	DATA ORBIT	ASCENDING NODE TIME HRMNSS	ASCENDING NODE LONG DEGREE	DESCENDING NODE TIME HRMNSS	DESCENDING NODE LONG DEGREE
87840	B	2321	0026					X	X	X	X		8785	004644	E162.6	014022	W030.8
87850	B	0040	0144					X	X	X	X		8786	023416	E135.7	032754	W057.7
8787R	B	0352	0512		X			X	X	X	X		8787	042147	E108.8	051526	W084.6
8788R	B	0537	0658		X			X	X	X	X		8788	060919	E081.9	070257	W111.5
8789A	B	0718	0838		X			X	X	X	X		8789	075651	E055.1	085029	W138.4
8790A	B	0904	1026		X			X	X	X	X		8790	094422	E028.2	103801	W165.3
8791A	B	1050	1212		X			X	X	X	X		8791	113154	E001.3	122532	E167.9
8792A	B	1236	1356		X			X	X	X	X		8792	131926	W025.6	141304	E141.0
8793A	B	1420	1540		X			X	X	X	X		8793	150658	W052.5	160036	E114.1
8794A	B	1604	1724		X			X	X	X	X		8794	165429	W079.4	174808	E087.2
8795A	B	1748	1911		X			X	X	X	X		8795	184201	W106.3	193539	W060.4
8796A	B	1936	2057		X			X	X	X	X		8796	202933	W133.1	212311	W033.5
8797A	B	2122	2242		X			X	X	X	X		8797	221704	W160.0	231043	E006.6

TABLE 2-2
DATA AVAILABILITY ON-OFF TIMES
30 MARCH 1977

INT ORBIT AND STDN	H D R S	HDRSS TIME ON HRMN	HDRSS TIME OFF HRMN	L R I R	T H I R	T D R E	S C A M	E S M R	E R B	P M R	T W R L	H I R S	DATA ORBIT	ASCENDING NODE TIME HRMNSS	ASCENDING NODE LONG DEGREE	DESCENDING NODE TIME HRMNSS	DESCENDING NODE LONG DEGREE
87980	B	0004	0109					X	X	X	X		8798	000436	E178.1	005814	W020.3
87990	B	0145	0249					X	X	X	X		8799	015208	E146.2	024546	W047.2
8800R	B	0327	0431		X			X	X	X	X		8800	033940	E119.4	043318	W074.1
8801R	B	0456	0618		X			X	X	X	X		8801	052711	E092.5	062050	W101.0
8802A	B	0636	0754		X			X	X	X	X		8802	071443	E065.6	080821	W127.8
8803A	B	0822	0944		X			X	X	X	X		8803	090215	E038.7	095553	W154.7
8804A	B	1008	1130		X			X	X	X	X		8804	104946	E011.8	114325	E178.4
8805A	B	1154	1317		X			X	X	X	X		8805	123718	W015.1	133057	E151.5
8806A	B	1340	1500		X			X	X	X	X		8806	142450	W042.0	151828	E124.6
8807A	B	1522	1644		X			X	X	X	X		8807	161222	W068.8	170600	E097.8
8808A	B	1708	1840		X			X	X	X	X		8808	175953	W095.7	185332	E070.9
8809A	B	1853	2015		X			X	X	X	X		8809	194725	W122.6	204103	E044.0
8810A	B	2040	2201		X			X	X	X	X		8810	213457	W149.5	222835	E017.1
8811A	B	2230	2347		X			X	X	X	X		8811	232229	W176.4	001607	W009.8

TABLE 2-2
DATA AVAILABILITY ON-OFF TIMES
31 MARCH 1977

INT ORBIT AND STDN	H D R S	HDRSS TIME ON HRMN	HDRSS TIME OFF HRMN	L R I R	T H I R	T D R E	S C A M	E S M R	E R B	P M R	T W R L	H I R S	DATA ORBIT	ASCENDING NODE TIME HRMNSS	ASCENDING NODE LONG DEGREE	DESCENDING NODE TIME HRMNSS	DESCENDING NODE LONG DEGREE
8811C	B	2344	0043					X	X	Y	X		8812	011000	E156.7	020339	W036.7
8812C	B	0132	0208					X	X	Y	X		8813	025732	E129.9	035110	W063.5
8815R	B	0601	0720		X			X	X	Y	X		8814	044504	E103.0	053842	W090.4
8816A	B	0740	0901		X			X	X	Y	X		8815	063235	E076.1	072614	W117.3
8817A	B	0928	1049		Y			X	X	Y	X		8816	082007	E049.3	091345	W144.2
8818A	B	1112	1235		X			X	X	Y	X		8817	100739	E022.3	110117	W171.1
8819A	B	1258	1419		X			X	X	Y	X		8818	115511	W004.5	124849	E162.0
8820A	B	1442	1602					X	X	Y	X		8819	134242	W031.4	143621	E135.2
8821A	B	1625	1748					X	X	Y	X		8820	153014	W058.3	162352	E109.3
8822A	B	1812	1934					X	X	Y	X		8821	171746	W085.2	181124	E081.4
8823A	B	2000	2120					X	X	Y	X		8822	190517	W112.1	195856	E054.5
8824A	B	2146	2306					X	X	Y	X		8823	205249	W139.0	214627	E027.6
													8824	224021	W165.8	233359	E000.8

TABLE 2-2
DATA AVAILABILITY ON-OFF TIMES
01 APRIL 1977

INT ORBIT AND STDN	H D R S	HDRSS TIME ON HRMN	HDRSS TIME OFF HRMN	L R I R	T H I R	T D R E	S C A M	E S M R	E R B	P M R	T W R L	H I R S	DATA ORBIT	ASCENDING NODE TIME HRMNSS	ASCENDING NODE LONG DEGREE	DESCENDING NODE TIME HRMNSS	DESCENDING NODE LONG DEGREE
8827R	B	0333	0455					X	X	Y	X		8825	002753	E167.3	012131	W026.1
8828R	B	0519	0640					X	X	Y	X		8826	021524	E140.4	030903	W053.0
8829A	B	0700	0819					X	X	Y	X		8827	040256	E113.5	045634	W079.9
8830A	B	0845	1007					X	X	Y	X		8828	055028	E086.6	064406	W106.8
8831A	B	1032	1154					X	X	Y	X		8829	073800	E059.8	083138	W133.7
8832A	B	1218	1339					X	X	Y	X		8830	092531	E032.9	101910	W160.6
8833A	B	1401	1522					X	X	Y	X		8831	111303	E006.0	120641	E172.6
8834A	B	1545	1707					X	X	Y	X		8832	130035	W020.9	135413	E145.7
8835A	B	1730	1852					X	X	Y	X		8833	144806	W047.8	154145	E118.8
8836A	B	1917	2039					X	X	Y	X		8834	163538	W074.7	172916	E091.9
8837A	B	2104	2225					X	X	Y	X		8835	182310	W101.5	191648	E065.1
8838A	B	2256	0010					X	X	Y	X		8836	201041	W128.4	210420	E038.2
													8837	215813	W155.3	225152	E011.3
													8838	234545	E177.8	003923	W015.6

TABLE 2-2
DATA AVAILABILITY ON-OFF TIMES
02 APRIL 1977

INT ORBIT AND STDN	H D R S	HDRSS TIME ON HRMN	HDRSS TIME OFF HRMN	L R I R	T H I R	T D R E	S C A M	E S M R	E E R B	P M R	T W R L	H I R S	DATA ORBIT	ASCENDING NODE TIME HRMNSS	ASCENDING NODE LONG DEGREE	DESCENDING NODE TIME HRMNSS	DESCENDING NODE LONG DEGREE
88380	B	0008	0110					X	X	X	X		8839	013317	E150.9	022655	W042.5
88390	B	0129	0231					X	X	X	X		8840	032049	E124.1	041427	W069.4
8840R	B	0308	0412					X	X	X	X		8841	050820	E097.2	060158	W096.2
8841R	B	0436	0600					X	X	X	X		8842	065552	E070.3	074930	W123.1
8842A	B	0618	0735					X	X	X	X		8843	084324	E043.4	093702	W150.0
8843A	B	0753	0925					X	X	X	X		8844	103055	E016.5	112434	W176.9
8844A	B	0949	1123					X	X	X	X		8845	121827	W010.4	131205	E156.2
8845A	B	1136	1258					X	X	X	X		8846	140559	W037.2	145937	E129.4
8846A	B	1320	1442					X	X	X	X		8847	155330	W064.2	164709	E102.5
8847A	B	1504	1626					X	X	X	X		8848	174102	W091.0	183440	E075.6
8848A	B	1648	1811					X	X	X	X		8849	192834	W117.9	202212	E048.7
8849A	B	1834	1957					X	X	X	X		8850	211606	W144.8	220944	E021.8
8850A	B	2022	2143					X	X	X	X		8851	230337	W171.7	235716	W005.1
8851A	B	2210	2324					X	X	X	X						

TABLE 2-2
DATA AVAILABILITY ON-OFF TIMES
03 APRIL 1977

INT ORBIT AND STDN	H D R S	HDRSS TIME ON HRMN	HDRSS TIME OFF HRMN	L R I R	T H I R	T D R E	S C A M	E S M R	E E R B	P M R	T W R L	H I R S	DATA ORBIT	ASCENDING NODE TIME HRMNSS	ASCENDING NODE LONG DEGREE	DESCENDING NODE TIME HRMNSS	DESCENDING NODE LONG DEGREE
8851C	B	2326	0029					X	X	X	X		8852	005109	E161.5	014447	W032.0
88520	B	0045	0148					X	X	X	X		8853	023841	E134.6	032219	W058.9
8854R	B	0356	0516					X	X	X	X		8854	042613	E107.7	051951	W085.7
8855R	B	0542	0702					X	X	X	X		8855	061344	E080.8	070722	W112.6
8856A	B	0722	0843					X	X	X	X		8856	080116	E053.9	085454	W139.5
8857A	B	0909	1023					X	X	X	X		8857	094849	E027.1	104226	W166.4
8858A	B	1054	1217					X	X	X	X		8858	113619	E000.2	122958	E166.8
8859A	B	1240	1402					X	X	X	X		8859	132351	W026.7	141729	E139.9
8860A	B	1424	1545					X	X	X	X		8860	151123	W053.6	160501	E113.0
8861A	B	1607	1730					X	X	X	X		8861	165854	W080.5	175233	E086.1
8862A	B	1752	1916					X	X	X	X		8862	184626	W107.4	194005	E059.2
8863A	B	1940	2102					X	X	X	X		8863	203358	W134.3	212736	E032.3
8864A	B	2128	2248					X	X	X	X		8864	222130	W161.1	231508	E005.4

TABLE 2-2
DATA AVAILABILITY ON-OFF TIMES
04 APRIL 1977

INT ORBIT AND STDN	HDRS	HDRSS TIME	LR	TH	TD	SC	SE	EP	MR	TW	TH	ASCENDING NODE			DESCENDING NODE	
	DR	ON	OFF	IR	IR	RA	MS	RB	ER	PL	RS	DATA ORBIT	TIME HRMNSS	LONG DEGREE	TIME HRMNSS	LONG DEGREE
88650	B	0004	0108				X	X	Y	X		8865	000901	E172.0	010240	W021.4
88660	B	0151	0252				X	X	Y	X		8866	015633	E145.1	025011	W048.3
8867R	B	0332	0434				X	X	Y	X		8867	034405	E118.2	043743	W075.2
8868R	B	0500	0622				X	X	Y	X		8868	053136	E094.3	062515	W102.1
8869A	B	0641	0759				X	X	Y	X		8869	071908	E064.4	081247	W129.0
8870A	B	0826	0948				X	X	Y	X		8870	090640	E037.6	100018	W155.8
8871A	B	1012	1136				X	X	Y	X		8871	105412	E010.7	114750	E177.3
8872A	B	1158	1321				X	X	Y	X		8872	124143	W016.2	133522	E150.4
8873A	B	1344	1504				X	X	Y	X		8873	142915	W043.1	152254	E123.5
8874A	B	1526	1646				X	X	Y	X		8874	161647	W070.0	171025	E096.6
8875A	B	1712	1834				X	X	Y	X		8875	180419	W096.8	185757	E069.7
8876A	B	1858	2020				X	X	Y	X		8876	195150	W123.7	204529	E042.9
8877A	B	2045	2205				X	X	Y	X		8877	213922	W150.6	223300	E016.0
8878A	B	2236	2352				X	X	Y	X		8878	232654	W177.5	002032	W010.9

TABLE 2-2
DATA AVAILABILITY ON-OFF TIMES
05 APRIL 1977

INT ORBIT AND STDN	HDRS	HDRSS TIME	LR	TH	TD	SC	SE	EP	MR	TW	TH	ASCENDING NODE			DESCENDING NODE	
	DR	ON	OFF	IR	IR	RA	MS	RB	ER	PL	RS	DATA ORBIT	TIME HRMNSS	LONG DEGREE	TIME HRMNSS	LONG DEGREE
88780	B	2350	0053				X	X	Y	X		8879	011425	E155.6	020804	W037.8
88790	B	0105	0211				X	X	Y	X		8880	030157	E128.7	035535	W064.7
8880R	B	0249	0341				X	X	Y	X		8881	044928	E101.9	054306	W091.5
8882A	B	0600	0715				X	X	Y	X		8882	063700	E075.0	073038	W118.4
8883A	B	0745	0905				X	X	Y	X		8883	082431	E048.1	091810	W145.3
8884A	B	0932	1053				X	X	Y	X		8884	101203	E021.2	110541	W172.2
8885A	B	1117	1240				X	X	Y	X		8885	115935	W005.7	125313	E160.9
8886A	B	1302	1424				X	X	Y	X		8886	134706	W032.5	144045	E134.1
8887A	B	1446	1607				X	X	Y	X		8887	153438	W059.4	162816	E107.2
8889A	B	1815	1938				X	X	Y	X		8888	172210	W086.3	181548	E080.3
8890A	B	2004	2124				X	X	Y	X		8889	190942	W113.2	200320	E053.4
8891A	B	2150	2310				X	X	Y	X		8890	205713	W140.1	215052	E026.5
												8891	224445	W167.0	233823	W000.4

TABLE 2-2
DATA AVAILABILITY ON-OFF TIMES
06 APRIL 1977

INT ORBIT AND STDN	H D R S	HDRSS TIME ON HRMN	HDRSS TIME OFF HRMN	L R I R	T H R R	T D R F	S C A M	E S M R	E R B	P M R	T W R L	H I R S	DATA ORBIT	ASCENDING NODE TIME HRMNSS	ASCENDING NODE LONG DEGREE	DESCENDING NODE TIME HRMNSS	DESCENDING NODE LONG DEGREE
88910	B	2308	0009					X	X	X	X		8892	003217	E166.2	012555	W027.2
88920	B	0024	0127					X	X	X	X		8893	021948	E139.3	031327	W054.1
8894R	B	0337	0459					X	X	X	X		8894	040720	E112.4	050058	W081.0
8895R	B	0523	0645					X	X	X	X		8895	055452	E085.5	064830	W107.9
8896A	B	0704	0823					X	X	X	X		8896	074224	E058.6	083602	W134.8
8897A	B	0849	1010					X	X	X	X		8897	092955	E031.8	102334	W161.7
8898A	B	1036	1158					X	X	X	X		8898	111727	E004.9	121105	E171.5
8899A	B	1232	1343					X	X	X	X		8899	130459	W022.0	135837	E144.6
8900A	B	1406	1527					X	X	X	X		8900	145230	W048.9	154609	E117.7
8901A	B	1549	1711					X	X	X	X		8901	164002	W075.8	173340	E090.8
8902A	B	1734	1855					X	X	X	X		8902	182734	W102.7	192112	E063.9
8903A	B	1921	2043					X	X	X	X		8903	201506	W129.6	210844	E037.1
8904A	B	2108	2229					X	X	X	X		8904	220237	W156.4	225616	E010.2
8905A	B	2300	0013					X	X	X	X		8905	235009	E176.7	004347	W016.7

TABLE 2-2
DATA AVAILABILITY ON-OFF TIMES
07 APRIL 1977

INT ORBIT AND STDN	H D R S	HDRSS TIME ON HRMN	HDRSS TIME OFF HRMN	L R I R	T H R R	T D R F	S C A M	E S M R	E R B	P M R	T W R L	H I R S	DATA ORBIT	ASCENDING NODE TIME HRMNSS	ASCENDING NODE LONG DEGREE	DESCENDING NODE TIME HRMNSS	DESCENDING NODE LONG DEGREE
89050	B	0012	0116					X	X	X	X		8906	013741	E149.8	023119	W043.6
89060	B	0126	0234					X	X	X	X		8907	032512	E122.9	041851	W070.5
8907R	B	0316	0417					X	X	X	X		8908	051244	E096.1	060622	W097.4
8908R	B	0441	0604					X	X	X	X		8909	070016	E069.2	075354	W124.3
8909A	B	0622	0739					X	X	X	X		8910	084748	E042.3	094126	W151.1
8910A	B	0808	0929					X	X	X	X		8911	103519	E015.4	112858	W178.0
8911A	B	0954	1117					X	X	X	X		8912	122251	W011.5	131629	E155.1
8912A	B	1140	1302					X	X	X	X		8913	141023	W038.4	150401	E128.2
8913A	B	1325	1446					X	X	X	X		8914	155754	W065.3	165133	E101.3
8914A	B	1508	1630					X	X	X	X		8915	174526	W092.1	183904	E074.4
8915A	B	1653	1816					X	X	X	X		8916	193258	W119.0	202636	E047.6
8916A	B	1838	2001					X	X	X	X		8917	212029	W145.9	221408	E020.7
8917A	B	2026	2147					X	X	X	X		8918	230801	W172.8	000140	W006.2
8918A	B	2216	2232					X	X	X	X						

TABLE 2-2
DATA AVAILABILITY ON-OFF TIMES
08 APRIL 1977

INT ORBIT AND STDN	H D R S	HDRSS TIME ON HRMN	HDRSS TIME OFF HRMN	L R I R	T H I R	T D R E	S C A M	E S M R	E P M R	T W R L	H I R S	DATA ORBIT	ASCENDING NODE TIME HRMNSS	ASCENDING NODE LONG DEGREE	DESCENDING NODE TIME HRMNSS	DESCENDING NODE LONG DEGREE
8921R	B	0400	0504					X	X	X	X	8919	005533	E160.3	014911	W033.1
8922R	B	0546	0706					X	X	X	X	8920	024305	E133.4	033643	W060.0
8923A	B	0726	0847					X	X	X	X	8921	043036	E106.6	052415	W086.8
8924A	B	0912	1036					X	X	X	X	8922	061808	E079.7	071146	W113.7
8925A	B	1058	1222					X	X	X	X	8923	080540	E052.8	085918	W140.6
8926A	B	1244	1406					X	X	X	X	8924	095311	E025.9	104650	W167.5
8927A	B	1428	1549					X	X	X	X	8925	114043	W001.0	123421	E165.6
8928R	B	1602	1721					X	X	X	X	8926	132815	W027.8	142153	E138.7
8929A	B	1757	1920					X	X	X	X	8927	151547	W054.7	160925	E111.9
8930A	B	1945	2049					X	X	X	X	8928	170318	W081.6	175656	E085.0
8931A	B	2132	2251					X	X	X	X	8929	185050	W108.5	194428	E058.1
												8930	203822	W135.4	213200	E031.2
												8931	222553	W162.3	231932	E004.3

TABLE 2-2
DATA AVAILABILITY ON-OFF TIMES
09 APRIL 1977

INT ORBIT AND STDN	H D R S	HDRSS TIME ON HRMN	HDRSS TIME OFF HRMN	L R I R	T H I R	T D R E	S C A M	E S M R	E P M R	T W R L	H I R S	DATA ORBIT	ASCENDING NODE TIME HRMNSS	ASCENDING NODE LONG DEGREE	DESCENDING NODE TIME HRMNSS	DESCENDING NODE LONG DEGREE
89320	B	0002	0106					X	X	X	X	8932	001325	E170.9	010703	W022.5
89330	B	0156	0300					X	X	X	X	8933	020057	E144.0	025435	W049.4
8934R	B	0335	0440					X	X	X	X	8934	034829	E117.1	044207	W076.3
8935R	B	0505	0627					X	X	X	X	8935	053600	E090.2	062939	W103.2
8936A	B	0645	0804					X	X	X	X	8936	072332	E063.3	081710	W130.1
8937A	B	0832	0953					X	X	X	X	8937	091104	E036.5	100442	W157.0
8938A	B	1016	1140					X	X	X	X	8938	105835	E009.8	115214	E176.2
8939A	B	1203	1325					X	X	X	X	8939	124607	W017.3	133945	E149.3
8940A	B	1348	1508					X	X	X	X	8940	143339	W044.2	152717	E122.4
8941A	B	1532	1652					X	X	X	X	8941	162110	W071.1	171449	E095.5
8942A	B	1716	1838					X	X	X	X	8942	180842	W098.0	190221	E068.6
8943A	B	1902	2025					X	X	X	X	8943	195614	W124.9	204952	E041.8
8944A	B	2049	2210					X	X	X	X	8944	214346	W151.8	223724	E014.9
8945A	B	2240	2356					X	X	X	X	8945	233117	W178.6	002456	W012.0

TABLE 2-2
DATA AVAILABILITY ON-OFF TIMES
10 APRIL 1977

INT ORBIT AND STDN	H D R S	HDRSS TIME ON HRMN	HDRSS TIME OFF HRMN	L R I R	T H I R	T D R E	S C A M	E S M R	E R B	P M R	T W R L	H I R S	DATA ORBIT	ASCENDING NODE TIME HRMNSS	ASCENDING NODE LONG DEGREE	DESCENDING NODE TIME HRMNSS	DESCENDING NODE LONG DEGREE
89450	B	2353	0058					X	X	X	X		8946	011849	E154.5	021227	W038.9
89460	B	0113	0217					X	X	X	X		8947	030621	E127.6	035959	W065.8
8947R	B	0253	0344					X	X	X	X		8948	045352	E100.8	054731	W092.7
8948R	B	0423	0545					X	X	X	X		8949	064124	E073.9	073503	W119.5
8949A	B	0604	0719					X	X	X	X		8950	082856	E047.0	092234	W146.5
8950A	B	0749	0911					X	X	X	X		8951	101628	E020.1	111006	W173.3
8951A	B	0936	1058					X	X	X	X		8952	120359	W006.8	125738	E159.8
8952A	B	1121	1244					X	X	X	X		8953	135131	W033.7	144509	E132.9
8953A	B	1306	1428					X	X	X	X		8954	153903	W060.5	163241	E106.1
8954A	B	1450	1612					X	X	X	X		8955	172634	W087.4	182013	E079.2
8955A	B	1634	1757					X	X	X	X		8956	191406	W114.3	200744	E052.3
8956A	B	1820	1943					X	X	X	X		8957	210138	W141.2	215516	E025.4
8957A	B	2008	2128					X	X	X	X		8958	224909	W168.1	234248	W001.5
8958A	B	2156	2314					X	X	X	X						

TABLE 2-2
DATA AVAILABILITY ON-OFF TIMES
11 APRIL 1977

INT ORBIT AND STDN	H D R S	HDRSS TIME ON HRMN	HDRSS TIME OFF HRMN	L R I R	T H I R	T D R E	S C A M	E S M R	E R B	P M R	T W R L	H I R S	DATA ORBIT	ASCENDING NODE TIME HRMNSS	ASCENDING NODE LONG DEGREE	DESCENDING NODE TIME HRMNSS	DESCENDING NODE LONG DEGREE
89580	B	2310	0011					X	X	X	X		8959	003641	E165.1	013020	W028.4
89590	B	0029	0133					X	X	X	X		8960	022413	E138.1	031752	W055.3
8961R	B	0342	0503					X	X	X	X		8961	041145	E111.3	050523	W082.2
8962R	B	0528	0649					X	X	X	X		8962	055916	E084.4	065255	W109.0
8963A	B	0708	0828					X	X	X	X		8963	074648	E057.5	084027	W135.9
8964A	B	0854	1015					X	X	X	X		8964	093420	E030.6	102758	W162.8
8965A	B	1040	1202					X	X	X	X		8965	112151	E003.8	121530	E170.4
8966A	B	1226	1348					X	X	X	X		8966	130923	W023.2	140302	E143.5
8967A	B	1410	1531					X	X	X	X		8967	145655	W050.0	155033	E116.6
8968A	B	1553	1715					X	X	X	X		8968	164427	W076.9	173805	E089.7
8969A	B	1738	1901					X	X	X	X		8969	183158	W103.8	192537	E062.8
8970A	B	1926	2047					X	X	X	X		8970	201930	W130.7	211308	E035.9
8971A	B	2113	2217					X	X	X	X		8971	220702	W157.6	230040	E009.1
8972A	B	2305	0018					X	X	X	X		8972	235433	E175.6	004812	W017.9

TABLE 2-2
DATA AVAILABILITY ON-OFF TIMES
12 APRIL 1977

INT ORBIT AND STDN	H D R S	HDRSS TIME ON HRMN	HDRSS TIME OFF HRMN	L R I R	T H I R	T D R E	S C A M	E S M R	E R B	P M R	T W R L	H I R S	DATA ORBIT	ASCENDING NODE TIME HRMNSS	ASCENDING NODE LONG DEGREE	DESCENDING NODE TIME HRMNSS	DESCENDING NODE LONG DEGREE
89720	B	0018	0121					X	X	X	X		8973	014205	E148.7	023544	W044.7
89730	B	0133	0240					X	X	X	X		8974	032937	E121.8	042315	W071.6
8974R	B	0316	0420					X	X	X	X		8975	051711	E094.9	061050	W098.5
8975R	B	0445	0608					X	X	X	X		8976	070443	E068.0	075821	W125.4
8976A	B	0628	0745					X	X	X	X		8977	085215	E041.2	094553	W152.3
8977A	B	0812	0917					X	X	X	X		8978	103946	E014.2	113325	W179.2
8978A	B	0958	1121					X	X	X	X		8979	122718	W012.6	132057	E153.9
8979A	B	1144	1306					X	X	X	X		8980	141450	W039.5	150828	E127.1
8980A	B	1329	1450					X	X	X	X		8981	160221	W066.4	165600	E100.2
8981A	B	1512	1634					X	X	X	X		8982	174953	W093.3	184332	E073.3
8982A	B	1657	1819					X	X	X	X		8983	193725	W120.2	203103	E046.4
8983A	B	1844	2006					X	X	X	X		8984	212456	W147.1	221835	E019.5
8984A	B	2030	2152					X	X	X	X		8985	231228	W173.9	000607	W007.3
8985A	B	2220	2337					X	X	X	X						

TABLE 2-2
DATA AVAILABILITY ON-OFF TIMES
13 APRIL 1977

INT ORBIT AND STDN	H D R S	HDRSS TIME ON HRMN	HDRSS TIME OFF HRMN	L R I R	T H I R	T D R E	S C A M	E S M R	E R B	P M R	T W R L	H I R S	DATA ORBIT	ASCENDING NODE TIME HRMNSS	ASCENDING NODE LONG DEGREE	DESCENDING NODE TIME HRMNSS	DESCENDING NODE LONG DEGREE
89850	B	2334	0038					X	X	X	X		8986	010000	E159.2	015338	W034.2
89860	B	0157	0050					X	X	X	X		8987	024731	E132.3	034110	W061.1
8988R	B	0404	0524					X	X	X	X		8988	043503	E105.5	052842	W088.0
8989R	B	0550	0710					X	X	X	X		8989	062235	E078.5	071614	W114.9
8990A	B	0732	0851					X	X	X	X		8990	081007	E051.7	090345	W141.8
8991A	B	0917	1039					X	X	X	X		8991	095739	E024.8	105117	W168.6
8992A	B	1104	1225					X	X	X	X		8992	114510	W002.1	123849	E164.5
8993A	B	1248	1353					X	X	X	X		8993	133242	W029.0	142620	E137.6
8994A	B	1432	1553					X	X	X	X		8994	152014	W055.9	161352	E110.7
8995A	B	1616	1738					X	X	X	X		8995	170745	W082.8	180124	E083.8
8996A	B	1801	1924					X	X	X	X		8996	185517	W109.6	194856	E057.0
8997A	B	1949	2109					X	X	X	X		8997	204249	W130.5	213627	E030.1
8998A	B	2137	2256					X	X	X	X		8998	223020	W103.4	232359	E003.2

TABLE 2-2
DATA AVAILABILITY ON-OFF TIMES
14 APRIL 1977

INT ORBIT AND STDN	HDRS	HDRSS TIME ON	HDRSS TIME OFF	LRI	THR	TDRF	SCAM	SEMR	EPHEM	PMR	THWR	HIRS	DATA ORBIT	ASCENDING NODE TIME HRMNSS	ASCENDING NODE LONG DEGREE	DESCENDING NODE TIME HRMNSS	DESCENDING NODE LONG DEGREE
90000	B	0201	0305					X	X	X	X		8999	001752	E169.7	011131	W023.7
9001R	B	0340	0445					X	X	Y	X		9000	020524	E142.8	025903	W050.6
9002R	B	0509	0631					X	X	Y	X		9001	035256	E116.0	044634	W077.5
9003A	B	0650	0808					X	X	Y	X		9002	054027	E089.1	063406	W104.3
9004A	B	0836	0957					X	X	Y	X		9003	072759	E062.2	082138	W131.2
9005A	B	1021	1144					X	X	Y	X		9004	091531	E035.3	100909	W158.1
9006A	B	1207	1329					X	X	X	X		9005	110302	E008.4	115641	E175.0
9007A	B	1352	1509					X	X	Y	X		9006	125034	W018.5	134413	E148.1
9008A	B	1536	1657					X	X	Y	X		9007	143806	W045.3	153145	E121.3
9009A	B	1720	1841					X	X	Y	X		9008	162538	W072.3	171916	E094.4
9010A	B	1908	2029					X	X	Y	X		9009	181309	W099.1	190648	E067.5
9011A	B	2053	2214					X	X	Y	X		9010	200041	W126.0	205420	E040.6
9012A	B	2244	0001					X	X	Y	X		9011	214813	W152.9	224151	E013.7
													9012	233544	W179.7	002923	W013.2

TABLE 2-2
DATA AVAILABILITY ON-OFF TIMES
15 APRIL 1977

INT ORBIT AND STDN	HDRS	HDRSS TIME ON	HDRSS TIME OFF	LRI	THR	TDRF	SCAM	SEMR	EPHEM	PMR	THWR	HIRS	DATA ORBIT	ASCENDING NODE TIME HRMNSS	ASCENDING NODE LONG DEGREE	DESCENDING NODE TIME HRMNSS	DESCENDING NODE LONG DEGREE
9014R	B	0244	0401					X	X	X	X		9013	012316	E153.4	021655	W040.0
9015R	B	0426	0549					X	X	X	X		9014	031048	E126.5	040427	W066.9
9016A	B	0608	0725					X	X	Y	X		9015	045820	E099.6	055158	W093.8
9017A	B	0753	0915					X	X	Y	X		9016	064551	E072.7	073930	W120.7
9018A	B	0911	1102					X	X	Y	X		9017	083323	E045.8	092702	W147.6
9019A	B	1126	1249					X	X	Y	X		9018	102055	E019.0	111433	W174.4
9020A	B	1310	1432					X	X	Y	X		9019	120827	W007.9	130205	E158.7
9021A	B	1454	1616					X	X	Y	X		9020	135558	W034.8	144937	E131.8
9022A	B	1638	1801					X	X	Y	X		9021	154330	W061.7	163709	E104.9
9023A	B	1824	1948					X	X	Y	X		9022	173102	W088.6	182440	E078.0
9024A	B	2012	2133					X	X	Y	X		9023	191833	W115.5	201212	E051.1
9025A	B	2200	2319					X	X	Y	X		9024	210605	W142.4	215944	E024.3
													9025	225337	W169.2	234716	W002.7

TABLE 2-2
DATA AVAILABILITY ON-OFF TIMES
16 APRIL 1977

INT ORBIT AND STDN	HDRS DATA		LR	TH	TD	SC	SEM	EPH	PM	TWR	THR	ASCENDING NODE			DESCENDING NODE	
	HDRS	TIME										DATA	TIME	LONG	TIME	LONG
	S	ON HRMN	OFF HRMN	R	R	F	N	R	B	R	L	S	ORBIT	HRMNSS	DEGREE	HRMNSS	DEGREE
90250	B	2315	0019					X	X	X	X		9026	004109	E163.9	013447	W029.5
90260	B	0034	0137					X	X	X	X		9027	022840	E137.0	032219	W056.4
9028R	B	0346	0506					X	X	X	X		9028	041612	E110.1	050951	W083.3
9029R	B	0533	0652					X	X	X	X		9029	060344	E083.3	065722	W110.2
9030A	B	0712	0832					X	X	X	X		9030	075115	E056.4	084454	W137.1
9032A	B	1044	1207					X	X	X	X		9031	093847	E029.5	103226	W163.9
9033A	B	1230	1351					X	X	X	X		9032	112619	E002.6	121958	E169.2
9034A	B	1414	1517					X	X	X	X		9033	131350	W024.3	140729	E142.3
9035A	B	1557	1720					X	X	X	X		9034	150122	W051.2	155501	E115.4
9036A	B	1744	1857					X	X	X	X		9035	164854	W078.1	174233	E088.5
9037A	B	1930	2052					X	X	X	X		9036	183626	W104.9	193004	E061.6
9038A	B	2117	2237					X	X	X	X		9037	202357	W131.8	211736	E034.8
													9038	221129	W158.7	230508	E007.9
													9039	235900	E174.4	005240	W019.0

TABLE 2-2
DATA AVAILABILITY ON-OFF TIMES
17 APRIL 1977

INT ORBIT AND STDN	HDRS DATA		LR	TH	TD	SC	SEM	EPH	PM	TWR	THR	ASCENDING NODE			DESCENDING NODE	
	HDRS	TIME										DATA	TIME	LONG	TIME	LONG
	S	ON HRMN	OFF HRMN	R	R	F	N	R	B	R	L	S	ORBIT	HRMNSS	DEGREE	HRMNSS	DEGREE
90390	B	2356	0059					X	X	X	X		9040	014632	E147.5	024011	W045.9
90400	B	0141	0244					X	X	X	X		9041	033404	E120.6	042743	W072.8
9041R	B	0320	0426					X	X	X	X		9042	052136	E093.8	061515	W099.6
9042R	B	0450	0612					X	X	X	X		9043	070908	E066.9	080246	W126.5
9043A	B	0632	0749					X	X	X	X		9044	085639	E040.0	095018	W153.4
9044A	B	0816	0938					X	X	X	X		9045	104411	E013.1	113750	E179.7
9045A	B	1004	1126					X	X	X	X		9046	123143	W013.8	132522	E152.8
9046A	B	1149	1310					X	X	X	X		9047	141914	W040.6	151253	E125.9
9047A	B	1333	1437					X	X	X	X		9048	160646	W067.5	170025	E099.1
9048A	B	1517	1638					X	X	X	X		9049	175418	W094.4	184757	E072.2
9049A	B	1701	1825					X	X	X	X		9050	194150	W121.3	203529	E045.3
9050A	B	1848	2010					X	X	X	X		9051	212921	W148.2	222300	E018.4
9051A	B	2036	2156					X	X	X	X		9052	231654	W175.1	001032	W008.5
9052A	B	2225	2342														

TABLE 2-2
DATA AVAILABILITY ON-OFF TIMES
18 APRIL 1977

INT ORBIT AND STDN	HDRS DR S	TIME ON HRMN	TIME OFF HRMN	LR IR R	TH DR E	TD CR F	SA MR	SE SM R	EB R	PM R	TR WL	TH IR S	DATA ORBIT	ASCENDING NODE TIME HRMNSS	ASCENDING NODE LONG DEGREE	DESCENDING NODE TIME HRMNSS	DESCENDING NODE LONG DEGREE
90520	B	2338	0042					X	X	X	X		9053	010425	E158.1	015804	W035.3
90530	B	0058	0201					X	X	X	X		9054	025156	E131.2	034535	W062.2
9055R	B	0408	0530					X	X	X	X		9055	043928	E104.3	053307	W089.1
9056R	B	0556	0714					X	X	X	X		9056	062700	E077.4	072039	W116.0
9057A	B	0736	0856					X	X	X	X		9057	081432	E050.5	090811	W142.9
9058A	B	0921	1044					X	X	X	X		9058	100203	E023.7	105542	W169.8
9059A	B	1108	1230					X	X	X	X		9059	114935	W003.2	124314	E163.4
9060A	B	1253	1414					X	X	X	X		9060	133707	W030.1	143046	E136.5
9061A	B	1436	1557					X	X	X	X		9061	152438	W057.0	161817	E109.6
9062A	B	1620	1743					X	X	X	X		9062	171210	W083.9	180549	E082.7
9063A	B	1806	1929					X	X	X	X		9063	185942	W110.8	195321	E055.8
9064A	B	1953	2114					X	X	X	X		9064	204714	W137.6	214053	E028.9
9065A	B	2140	2301					X	X	X	X		9065	223445	W164.5	232824	E002.1

TABLE 2-2
DATA AVAILABILITY ON-OFF TIMES
19 APRIL 1977

INT ORBIT AND STDN	HDRS DR S	TIME ON HRMN	TIME OFF HRMN	LR IR R	TH DR E	TD CR F	SA MR	SE SM R	EB R	PM R	TR WL	TH IR S	DATA ORBIT	ASCENDING NODE TIME HRMNSS	ASCENDING NODE LONG DEGREE	DESCENDING NODE TIME HRMNSS	DESCENDING NODE LONG DEGREE
9066C	B	0017	0121					X	X	X	X		9066	002217	E168.6	011556	W024.8
90670	B	0205	0308					X	X	X	X		9067	020949	E141.7	030328	W051.7
9069R	B	0349	0433					X	X	X	X		9068	035720	E114.8	045059	W078.6
9070A	B	0654	0813					X	X	X	X		9069	054454	E087.9	063833	W105.5
9071A	B	0840	1002					X	X	X	X		9070	073226	E061.1	082605	W132.4
9072A	B	1026	1148					X	X	X	X		9071	091958	E034.2	101337	W159.2
9073A	B	1212	1334					X	X	X	X		9072	110729	E007.3	120108	E173.9
9074A	B	1356	1517					X	X	X	X		9073	125501	W019.6	134840	E147.0
9075A	B	1540	1701					X	X	X	X		9074	144233	W046.5	153612	E120.1
9076A	B	1724	1847					X	X	X	X		9075	163005	W073.4	172344	E093.2
9077A	B	1911	2033					X	X	X	X		9076	181736	W100.2	191115	E066.3
9078A	B	2058	2218					X	X	X	X		9077	200508	W127.1	205847	E039.5
9079A	B	2249	0005					X	X	X	X		9078	215240	W154.0	224619	E012.6
													9079	234011	E179.1	003350	W014.3

TABLE 2-2
DATA AVAILABILITY ON-OFF TIMES
20 APRIL 1977

INT ORBIT AND STDN	H D R S	HDRSS TIME ON HRMN	OFF HRMN	L R I R	T H I R	T D R F	S C A M	E S M R	E R B	P M R	T W R L	H I R S	DATA ORBIT	ASCENDING NODE TIME HRMNSS	LONG DEGREE	DESCENDING NODE TIME HRMNSS	LONG DEGREE
90790	B	0004	0106					X	X	Y	X		9080	012743	E152.2	022122	W041.2
9080C	B	0122	0226					X	X	Y	X		9081	031515	E125.4	040854	W068.1
9082R	B	0438	0554					X	X	Y	X		9082	050247	E098.5	055636	W094.9
9083A	B	0613	0729					X	X	Y	X		9083	065018	E071.6	074357	W121.8
9084A	B	0756	0918					X	X	Y	X		9084	083750	E044.7	093129	W148.7
9085A	B	0945	1104					X	X	Y	X		9085	102522	E017.8	111901	W175.6
9086A	B	1130	1249					X	X	Y	X		9086	121253	W009.7	130633	E157.5
9087A	B	1315	1434					X	X	Y	X		9087	140025	W035.9	145404	E130.6
9088A	B	1500	1619					X	X	Y	X		9088	154757	W062.9	164136	E103.8
9089A	B	1644	1805		X			X	X	Y	X		9089	173529	W089.7	182908	E076.9
9090A	B	1828	1949		X			X	X	Y	X		9090	192300	W116.6	201639	E050.0
9091A	B	2017	2132		X			X	X	Y	X		9091	211032	W143.5	220411	E023.1
9092A	B	2328	0029		X				X	Y	X		9092	225804	W170.4	235143	W003.8

TABLE 2-2
DATA AVAILABILITY ON-OFF TIMES
21 APRIL 1977

INT ORBIT AND STDN	H D R S	HDRSS TIME ON HRMN	OFF HRMN	L R I R	T H I R	T D R F	S C A M	E S M R	E R B	P M R	T W R L	H I R S	DATA ORBIT	ASCENDING NODE TIME HRMNSS	LONG DEGREE	DESCENDING NODE TIME HRMNSS	LONG DEGREE
9095R	B	0350	0508		X				X	Y	X		9093	004536	E162.8	013915	W030.6
9096R	B	0536	0657		X				X	Y	X		9094	023307	E135.9	032646	W057.5
9097A	B	0716	0837		X				X	Y	X		9095	042039	E109.0	051418	W084.4
9098A	B	0902	1025		X				X	Y	X		9096	060811	E082.1	070150	W111.3
9099A	B	1048	1210		X				X	Y	X		9097	075542	E055.2	084922	W138.2
9100A	B	0902	1354		X				X	Y	X		9098	094314	E028.4	103653	W165.1
9101A	B	1418	1539		X				X	Y	X		9099	113046	E001.5	122425	E168.1
9102A	B	1602	1724		X				X	Y	X		9100	131818	W025.4	141157	E141.2
9103A	B	1748	1910		X				X	Y	X		9101	150549	W052.3	155929	E114.3
9104A	B	1936	2054		X				X	Y	X		9102	165321	W079.2	174700	E087.4
9105A	B	2121	2241		X				X	Y	X		9103	184053	W106.1	193432	E060.5
													9104	202824	W133.0	212204	E033.7
													9105	221556	W159.8	230936	E006.8

TABLE 2-2
DATA AVAILABILITY ON-OFF TIMES
22 APRIL 1977

INT ORBIT AND STDN	H D R S	HDRSS TIME ON HRMN	HDRSS TIME OFF HRMN	L R I R	T H I R	T D R E	S C A M	S E M R	E P R B	M R	T W R L	H I R S	DATA ORBIT	ASCENDING NODE TIME HRMNSS	ASCENDING NODE LONG DEGREE	DESCENDING NODE TIME HRMNSS	DESCENDING NODE LONG DEGREE
9108R	B	0310	0429		X				X	X	X		9106	000328	E173.3	005707	W020.1
9109R	B	0454	0617		X				X	X	X		9107	015100	E146.4	024439	W047.0
9110A	B	0636	0752		X				X	X	X		9108	033831	E119.5	043211	W073.9
9111A	B	0821	0934		X				X	X	X		9109	052603	E092.7	061942	W100.8
9112A	B	1008	1121		X				X	X	X		9110	071335	E065.8	080714	W127.6
9113A	B	1153	1308		X				X	X	X		9111	090107	E038.9	095446	W154.6
9114A	B	1338	1452		X				X	X	X		9112	104838	E012.0	114218	E178.6
9115A	B	1521	1635		X				X	X	X		9113	123610	W014.9	132949	E151.7
9116A	B	1706	1825		X				X	X	X		9114	142342	W041.8	151721	E124.8
9117A	B	1852	2005		X				X	X	X		9115	161113	W068.7	170453	E097.9
9118A	B	2040	2153		X				X	X	X		9116	175845	W095.6	185224	E071.1
9119A	B	2229	2345		X				X	X	X		9117	194617	W122.4	203956	E044.2
													9118	213349	W149.3	222728	E017.3
													9119	232120	W176.2	001500	W009.6

TABLE 2-2
DATA AVAILABILITY ON-OFF TIMES
23 APRIL 1977

INT ORBIT AND STDN	H D R S	HDRSS TIME ON HRMN	HDRSS TIME OFF HRMN	L R I R	T H I R	T D R E	S C A M	S E M R	E P R B	M R	T W R L	H I R S	DATA ORBIT	ASCENDING NODE TIME HRMNSS	ASCENDING NODE LONG DEGREE	DESCENDING NODE TIME HRMNSS	DESCENDING NODE LONG DEGREE
9119C	B	2342	0046						X	X	X		9120	010852	E156.9	020231	W036.5
9120C	B	0102	0207						X	X	X		9121	025624	E130.0	035003	W063.4
9122R	B	0412	0528		X				X	X	X		9122	044355	E103.2	053735	W090.3
9123R	B	0600	0718		X				X	X	X		9123	063127	E076.3	072507	W117.1
9124A	B	0739	0855		X				X	X	X		9124	081859	E049.4	091238	W144.0
9125A	B	0925	1048		X				X	X	X		9125	100631	E022.5	110010	W170.9
9126A	B	1111	1234		X				X	X	X		9126	115402	W004.4	124742	E162.2
9127A	B	1258	1411		X				X	X	X		9127	134134	W031.3	143513	E135.3
9129A	B	1624	1740		X				X	X	X		9128	152906	W058.1	162245	E108.4
9130A	B	1810	1932		X				X	X	X		9129	171637	W085.0	181017	E081.6
9131A	B	1958	2113		X				X	X	X		9130	190409	W111.9	195749	E054.7
9132A	B	2145	2304		X				X	X	X		9131	205141	W138.8	214520	E027.8
													9132	223913	W165.7	233252	E000.9

TABLE 2-2
DATA AVAILABILITY ON-OFF TIMES
24 APRIL 1977

INT ORBIT AND STDN	H D R S	HDRSS TIME ON HRMN	HDRSS TIME OFF HRMN	LR IR R	THR IR R	TDR EM F	SCA MR M	SEM RR R	EBR R B	PMR R R	TWR R L	HIR R S	DATA ORBIT	ASCENDING NODE TIME HRMNSS	ASCENDING NODE LONG DEGREE	DESCENDING NODE TIME HRMNSS	DESCENDING NODE LONG DEGREE
91320	B	2301	0006						X	X	X		9133	002643	E167.5	012022	W025.9
91330	B	0019	0123						X	X	X		9134	021415	E140.6	030754	W052.8
9135R	B	0332	0453		X				X	X	X		9135	040146	E113.7	045526	W079.7
9136R	B	0519	0640		X				X	X	X		9136	054918	E086.8	064258	W106.6
9137A	B	0659	0810		X				X	X	X		9137	073650	E059.9	083029	W133.5
9138A	B	0847	0951		X				X	X	X		9138	092422	E033.1	101801	W160.4
9139A	B	1031	1147		X				X	X	X		9139	111153	E006.2	120533	E172.8
9140A	B	1216	1327		X				X	X	X		9140	125925	W020.7	135304	E145.9
9141A	B	1400	1516		X				X	X	X		9141	144657	W047.6	154036	E119.0
9142A	B	1544	1700		X				X	X	X		9142	163428	W074.5	172808	E092.1
9143A	B	1728	1843		X				X	X	X		9143	182200	W101.4	191540	E065.2
9144A	B	1916	2036		X				X	X	X		9144	200932	W128.3	210311	E038.3
9145A	B	2102	2223		X				X	X	X		9145	215704	W155.1	225043	E011.5
9146A	B	2254	0008		X				X	X	X		9146	234435	E178.0	003815	W015.4

TABLE 2-2
DATA AVAILABILITY ON-OFF TIMES
25 APRIL 1977

INT ORBIT AND STDN	H D R S	HDRSS TIME ON HRMN	HDRSS TIME OFF HRMN	LR IR R	THR IR R	TDR EM F	SCA MR M	SEM RR R	EBR R B	PMR R R	TWR R L	HIR R S	DATA ORBIT	ASCENDING NODE TIME HRMNSS	ASCENDING NODE LONG DEGREE	DESCENDING NODE TIME HRMNSS	DESCENDING NODE LONG DEGREE
91460	B	0007	0110						X	X	X		9147	013207	E151.1	022547	W042.3
9147C	B	0124	0230						X	X	X		9148	031939	E124.2	041318	W069.2
9148R	B	0308	0406		X				X	X	X		9149	050710	E097.4	060050	W096.1
9149R	B	0436	0540		X				X	X	X		9150	065442	E070.5	074822	W123.0
9150A	B	0618	0730		X				X	X	X		9151	084214	E043.6	093553	W149.9
9151A	B	0803	0923		X				X	X	X		9152	102946	E016.7	112325	W176.7
9152A	B	0948	1111		X				X	X	X		9153	121717	W010.2	131057	E156.4
9153A	B	1134	1257		X				X	X	X		9154	140449	W037.1	145829	E129.5
9154A	B	1319	1440		X				X	X	X		9155	155221	W064.0	164600	E102.6
9155A	B	1504	1624		X				X	X	X		9156	173952	W090.8	183332	E075.8
9156A	B	1647	1810		X				X	X	X		9157	192724	W117.7	202109	E048.9
9157A	B	1834	1956		X				X	X	X		9158	211456	W144.6	220836	E022.0
9158A	B	2021	2141		X				X	X	X		9159	230228	W171.5	235607	W004.9
9159A	B	2209	2328		X				X	X	X						

TABLE 2-2
DATA AVAILABILITY ON-OFF TIMES
26 APRIL 1977

INT ORBIT AND STDN	H D R S	HDRSS TIME ON HRMN	HDRSS TIME OFF HRMN	L R I R	T H I R	T D R E	S C A M	E S M R	E P M R	T W R L	H I R S	DATA ORBIT	ASCENDING NODE TIME HRMNSS	ASCENDING NODE LONG DEGREE	DESCENDING NODE TIME HRMNSS	DESCENDING NODE LONG DEGREE
91590	B	2324	0027						X	X	X	9160	004959	E161.6	014339	W031.8
91600	B	0041	0147						X	X	X	9161	023731	E134.7	033111	W058.7
9162R	B	0354	0515		X				X	X	X	9162	042503	E107.9	051842	W085.6
9163R	B	0540	0701		X				X	X	X	9163	061234	E081.0	070614	W112.4
9164A	B	0721	0842		X				X	X	X	9164	080006	E054.1	085346	W139.3
9165A	B	0907	1029		X				X	X	X	9165	094738	E027.2	104118	W166.2
9166A	B	1053	1216		X				X	X	X	9166	113510	E000.3	122849	E166.9
9167A	B	1239	1359		X				X	X	X	9167	132241	W026.6	141621	E140.0
9168A	B	1423	1544		X				X	X	X	9168	151013	W053.4	160353	E113.1
9169A	B	1606	1728		X				X	X	X	9169	165745	W080.3	175124	E086.3
9170A	B	1751	1915		X				X	X	X	9170	184516	W107.2	193856	E059.4
9171A	B	1940	2100		X				X	X	X	9171	203248	W134.1	212628	E032.5
9172A	B	2126	2246		X				X	X	X	9172	222020	W161.0	231359	E005.7

TABLE 2-2
DATA AVAILABILITY ON-OFF TIMES
27 APRIL 1977

INT ORBIT AND STDN	H D R S	HDRSS TIME ON HRMN	HDRSS TIME OFF HRMN	L R I R	T H I R	T D R E	S C A M	E S M R	E P M R	T W R L	H I R S	DATA ORBIT	ASCENDING NODE TIME HRMNSS	ASCENDING NODE LONG DEGREE	DESCENDING NODE TIME HRMNSS	DESCENDING NODE LONG DEGREE
9173C	B	0003	0107						X	X	X	9173	000752	E172.2	010131	W021.3
9174C	B	0148	0246						X	X	X	9174	015523	E145.3	024903	W048.1
9177A	B	0330	0418		X				X	X	X	9175	034255	E118.4	043635	W075.0
9179A	B	1011	1135		X				X	X	X	9176	053027	E091.5	062407	W101.9
9180A	B	1157	1319		X				X	X	X	9177	071759	E064.6	081138	W128.8
9181A	B	1343	1503		X				X	X	X	9178	090530	E037.7	095910	W155.7
9182A	B	1526	1647		X				X	X	X	9179	105302	E010.9	114642	E177.4
9183A	B	1710	1833		X				X	X	X	9180	124034	W016.0	133413	E150.6
9184A	B	1857	2018		X				X	X	X	9181	142805	W042.9	152145	E123.7
9185A	B	2044	2205		X				X	X	X	9182	161537	W069.8	170917	E096.8
9186A	B	2233	2351		X				X	X	X	9183	180309	W096.7	185649	E069.9
												9184	195041	W123.5	204420	E043.0
												9185	213812	W150.5	223152	E016.2
												9186	232544	W177.3	001924	W010.7

TABLE 2-2
DATA AVAILABILITY ON-OFF TIMES
28 APRIL 1977

INT ORBIT AND STDN	HDR	HDRSS TIME ON	HDRSS TIME OFF	LIR	THR	TDRE	SCAMR	ESMR	EPMR	TWRR	HIRS	DATA ORBIT	ASCENDING NODE TIME HRMNSS	ASCENDING NODE LONG DEGREE	DESCENDING NODE TIME HRMNSS	DESCENDING NODE LONG DEGREE
9186C	B	2347	0051					X	X	X		9187	011316	E155.8	020656	W037.6
9187C	B	0105	0211					X	X	X		9188	030047	E128.9	035427	W064.5
9188R	B	0250	0340		X			X	X	X		9189	044819	E102.0	054159	W091.4
9189R	B	0416	0540		X			X	X	X		9190	063551	E075.2	072931	W118.3
9190A	B	0558	0714		X			X	X	X		9191	082323	E048.3	091702	W145.1
9191A	B	0744	0905		X			X	X	X		9192	101054	E021.4	110434	W172.0
9192A	B	0930	1052		X			X	X	X		9193	115826	W005.5	125206	E161.1
9193A	B	1117	1238		X			X	X	X		9194	134558	W032.4	143938	E134.2
9194A	B	1301	1422		X			X	X	X		9195	153329	W059.2	162709	E107.3
9195A	B	1445	1606		X			X	X	X		9196	172101	W086.1	181441	E080.5
9196A	B	1629	1752		X			X	X	X		9197	190833	W113.0	200213	E053.6
9197A	B	1814	1937		X			X	X	X		9198	205605	W139.9	214945	E026.7
9198A	B	2002	2123		X			X	X	X		9199	224336	W166.8	233716	W000.2
9199A	B	2149	2309		X			X	X	X						

TABLE 2-2
DATA AVAILABILITY ON-OFF TIMES
29 APRIL 1977

INT ORBIT AND STDN	HDR	HDRSS TIME ON	HDRSS TIME OFF	LIR	THR	TDRE	SCAMR	ESMR	EPMR	TWRR	HIRS	DATA ORBIT	ASCENDING NODE TIME HRMNSS	ASCENDING NODE LONG DEGREE	DESCENDING NODE TIME HRMNSS	DESCENDING NODE LONG DEGREE
9202R	B	0337	0458		X			X	X	X		9200	003108	E166.3	012448	W027.1
9203R	B	0522	0643		X			X	X	X		9201	021840	E139.5	031220	W054.0
9204A	B	0702	0821		X			X	X	X		9202	040611	E112.5	045951	W080.8
9205A	B	0848	1010		X			X	X	X		9203	055343	E085.7	064723	W107.7
9206A	B	1034	1156		X			X	X	X		9204	074115	E058.8	083455	W134.6
9207A	B	1220	1342		X			X	X	X		9205	092847	E031.9	102227	W161.5
9208A	B	1405	1525		X			X	X	X		9206	111618	E005.1	120958	E171.6
9209A	B	1549	1710		X			X	X	X		9207	130350	W021.9	135730	E144.7
9210A	B	1733	1855		X			X	X	X		9208	145122	W048.7	154502	E117.9
9211A	B	1920	2041		X			X	X	X		9209	163853	W075.6	173233	E091.0
9212A	B	2107	2228		X			X	X	X		9210	182625	W102.5	192005	E064.1
9213A	B	2258	0012		X			X	X	X		9211	201357	W129.4	210737	E037.2
												9212	220129	W156.3	225509	E010.3
												9213	234900	E176.9	004240	W016.6

TABLE 2-2
DATA AVAILABILITY ON-OFF TIMES
30 APRIL 1977

INT ORBIT AND STDN	HDRS	HDRSS TIME ON	HDRSS TIME OFF	LRIR	THIR	TDRF	SCAM	ESMR	ERB	PMR	TWRL	HIRS	DATA ORBIT	ASCENDING NODE TIME HRMNSS	ASCENDING NODE LONG DEGREE	DESCENDING NODE TIME HRMNSS	DESCENDING NODE LONG DEGREE
92130	B	0011	0114						X	X	X		9214	013632	E150.0	023012	W043.5
92140	B	0131	0234						X	X	X		9215	032404	E123.1	041744	W070.3
9215R	B	0311	0415		X				X	X	X		9216	051135	E096.2	060516	W097.2
9216R	B	0440	0603		X				X	X	X		9217	065907	E069.3	075247	W124.1
9217A	B	0621	0738		X				X	X	X		9218	084639	E042.4	094019	W151.0
9218A	B	0806	0928		X				X	X	X		9219	103411	E015.6	112751	W177.9
9219A	B	0953	1115		X				X	X	X		9220	122142	W011.3	131522	E155.3
9220A	B	1139	1301		X				X	X	X		9221	140514	W038.2	150254	E128.4
9221A	B	1323	1445		X				X	X	X		9222	155646	W065.1	165026	E101.5
9222A	B	1507	1629		X				X	X	X		9223	174417	W092.0	183857	E074.6
9223A	B	1651	1815		X				X	X	X		9224	193149	W118.9	202529	E047.7
9224A	B	1837	2000		X				X	X	X		9225	211921	W145.7	221301	E020.8
9225A	B	2025	2145		X				X	X	X		9226	230653	W172.6	000033	W006.0
9226A	B	2213	2333		X				X	X	X						

SECTION 3

ORBIT DISPLAYS OF ESMR

This section briefly describes the ESMR experiment, the format of the image displays derived from the data of this experiment and presents image examples of selected data. A complete description of the ESMR experiment is found in Section 5 of The Nimbus 6 User's Guide.

The ESMR is a two-channel scanning radiometer receiving microwave radiation in a 250 MHz band centered at 37 GHz. One channel is used to measure the vertical polarization of the radiation, and the other measures the horizontal polarization. The antenna beam scans ahead of the spacecraft along a conical surface with a constant angle of 45 degrees with respect to the antenna axis. Spatial resolution of each element is about 20 km in the cross-track direction by 45 km in the direction parallel to the subpoint track.

For a brief description of the HIRS and SCAMS experiments formerly described in this Section, see The Nimbus 6 Data Catalog, Volume 5, Section 3. A complete description of the HIRS and SCAMS experiments may be found in The Nimbus 6 User's Guide, Sections 3 and 4 respectively.

All useable HIRS and SCAMS data have been converted to 4" x 5" black and white images. ESMR data will continue to be converted to 4" x 5" black and white image as long as the experiment continues to function in an operational mode. Selected images from the ESMR experiment for March and April 1977 are presented in this section. Complete coverage times are listed in the Data Availability ON-OFF Times in Table 2-2.

Section 5 of The Nimbus 6 User's Guide describes in detail the image format of the ESMR. The following is a summary of the format, detailing changes to the User's Guide where needed. The processed display contains the following items:

- NIMBUS 6 (ESMR)

  This identifies the satellite and the experiment.

- (DATE)

  This identifies the Greenwich month, day, and year the data were recorded on board the satellite.

- SCALE F (P2)

  Since orbit 3933, ESMR has operated in the P (partial mode). For each experiment the data from each interrogation orbit is displayed on a single

image. Through orbit 3932 (31 March 1976), each ESMR scan line is displayed once and twice after orbit 3932. Similarly, each of the 71 scan spot elements is displayed once through orbit 3932 and twice after orbit 3933.

- INT ORBIT

The interrogation orbit number identifies the orbit in progress when the recorded data is transmitted to a STDN station. Usually parts of two data orbits are on the same display. The interrogation orbit number will only identify the last orbit of each display.

- TIME (and) SUBPOINT

Satellite time and latitude-longitude information are presented along the vertical line down the center of each display. The line represents the satellite subpoint track, which is located down the center of each of the swaths on each display. Time is GMT with ticks along the left side of the line at each five minute mark (on the five minutes). Time is annotated (hour and minute) every 15 minutes (on the quarter hour).

Subpoint information presents latitude and longitude positions of the satellite subpoint. Each tick mark on the right side of the vertical line is annotated with the subpoint latitude and longitude (to the nearest degree). Latitude is labeled N (north) or S (south). Longitude is labeled E (east) or W (west).

After orbit 3933 and again at orbit 6185, the ESMR data display was changed. The following condensed changes apply for TIME and SUBPOINT information: Satellite time information is presented along the vertical lines to the left and to the right of the data display. Time is GMT with 5 minute tick marks. Time annotations consist of hour-minute displays with 15 minute intervals or quarter hour notations.

Latitude and longitude coordinates are in grid form centrally placed between two sets of data; each data set are a compliment of the appropriate grid overlay immediately adjacent to its border. For a complete description of new format see ESMR CHANNEL-RANGE DISPLAYS, this section of the catalog.

- GRAY SCALE

Each image has an 18-step scale along the bottom of the display. The gray scales are used to define parameter value intervals for each image swath of each display by assigning different parameter values to the gray scale for each swath. Table 3-1 through 3-3 define the parameter values versus gray scale for each ESMR image swath.

Table 3-1

Brightness Temperature Value for each Step of the Gray Scale on ESMR Image Displays for Orbits 828 through 3932 (13 August 1975 through 31 March 1976) (Brightness Temperatures are in °K)

Gray Scale Number		Swath Number and ESMR Display Parameter									
		1 and 11 (T_H)	2 and 12 (T_V)	3 and 13 $\left(\frac{T_H+T_V}{2}\right)$	4 and 14 (T_H)	5 and 15 (T_V)	6 and 16 $\left(\frac{T_H+T_V}{2}\right)$	7 and 17 (T_H)	8 and 18 (T_V)	9 and 19 $\left(\frac{T_H+T_V}{2}\right)$	10 and 20 (T_V-0.6T_H)
(black)	1	> 200	> 230	> 210	> 250	> 270	> 250	> 290	> 300	> 280	>140
	2	196-200	226-230	206-210	246-250	267-270	247-250	287-290	298-300	278-280	136-140
	3	191-196	223-226	203-206	243-246	264-267	244-247	284-287	295-298	275-278	133-136
	4	187-191	219-223	199-203	239-243	261-264	241-244	281-284	293-295	273-275	129-133
	5	183-187	215-219	195-199	235-239	258-261	238-241	278-281	290-293	270-273	125-129
	6	178-183	211-215	191-195	231-235	254-258	234-238	274-278	288-290	268-270	121-125
	7	174-178	208-211	188-191	228-231	251-254	231-234	271-274	285-288	265-268	118-121
	8	169-174	204-208	184-188	224-228	248-251	228-231	268-271	283-285	263-265	114-118
	9	165-169	200-204	180-184	220-224	245-248	225-228	265-268	280-283	260-263	110-114
	10	161-165	196-200	176-180	216-220	242-245	222-225	262-265	278-280	258-260	106-110
	11	156-161	193-196	173-176	213-216	239-242	219-222	259-262	275-278	255-258	103-106
	12	152-156	189-193	169-173	209-213	236-239	216-219	256-259	273-275	253-255	99-103
	13	148-152	185-189	165-169	205-209	233-236	213-216	253-256	270-273	250-253	95-99
	14	143-148	181-185	161-165	201-205	229-233	209-213	249-253	268-270	248-250	91-95
	15	139-143	178-181	158-161	198-201	226-229	206-209	246-249	265-268	245-248	88-91
	16	134-139	174-178	154-158	194-198	223-226	203-206	243-246	263-265	243-245	84-88
	17	130-134	170-174	150-154	190-194	220-223	200-203	240-243	260-263	240-243	80-84
(white)	18	< 130	< 170	< 150	< 190	< 220	< 200	< 240	< 260	< 240	< 80

T_H = Brightness temperature derived from the ESMR horizontal polarization data

T_V = Brightness temperature derived from the ESMR vertical polarization data

Table 3-2

Brightness Temperature Value for each Step of the Gray Scale on ESMR Image Displays for Orbits 3933 through 6184 (31 March through 15 September 1976)

(Brightness Temperatures are in °K)

Gray Scale Number	Swath Number and ESMR Display Parameter				
	1 and 6 (T_H)	2 and 7 (T_H)	3 and 8 (T_H)	4 and 9 (T_V)	5 and 10 $\left(\frac{T_H + T_V}{2}\right)$
(black) 1	> 200	> 230	> 210	> 250	> 270
2	196-200	226-230	206-210	246-250	267-270
3	191-196	223-226	203-206	243-246	264-267
4	187-191	219-223	199-203	239-243	261-264
5	183-187	215-219	195-199	235-239	258-261
6	178-183	211-215	191-195	231-235	254-258
7	174-178	208-211	188-191	228-231	252-254
8	169-174	204-208	184-188	224-228	248-251
9	165-169	200-204	180-184	220-224	245-248
10	161-165	196-200	176-180	216-220	242-245
11	156-161	193-196	173-176	213-216	239-242
12	152-156	189-193	169-173	209-213	236-239
13	148-152	185-189	165-169	205-209	233-236
14	143-148	181-185	161-165	201-205	229-233
15	139-143	178-181	158-161	198-201	226-229
16	134-139	174-178	154-158	194-198	223-226
17	130-134	170-174	150-154	190-194	220-223
(white) 18	< 130	<170	<150	<190	< 220

T_H = Brightness temperature derived from the ESMR horizontal polarization data

T_V = Brightness temperature derived from the ESMR vertical polarization data

Table 3-3

Brightness Temperature Value for each Step of the Gray Scale on ESMR Image Displays for Orbits 6185 (15 September 1976) through the Present Catalog Period

(Brightness Temperatures are in °K)

Gray Scale Number	Swath Number and ESMR Display Parameter				
	1 and 6 (T_V)	2 and 7 (T_V)	3 and 8 (T_V)	4 and 9 (T_V)	5 and 10 (T_V)
(black) 1	> 240	> 254	> 270	> 280	> 300
2	236-240	251-254	266-270	277-280	296-300
3	233-236	248-251	263-266	274-277	293-296
4	230-233	245-248	260-263	271-274	290-293
5	227-230	242-245	257-260	268-271	287-290
6	224-227	239-242	254-257	265-268	284-287
7	221-224	236-239	251-254	262-265	281-284
8	218-221	233-236	248-251	259-262	278-281
9	215-218	230-233	245-248	256-259	275-278
10	212-215	227-230	242-245	253-256	272-275
11	209-212	224-227	239-242	250-253	269-272
12	206-209	221-224	236-239	247-250	266-269
13	203-206	218-221	233-236	244-247	263-266
14	200-203	215-218	230-233	241-244	260-263
15	197-200	212-215	227-230	239-241	257-260
16	193-197	208-212	223-227	237-239	253-257
17	190-193	205-208	220-223	235-237	250-253
(white) 18	< 190	< 205	< 220	< 235	< 250

T_V = Brightness temperature derived from the ESMR vertical polarization data

- 3200

  This identifies the computer used to process the data. All data was processed by the Control Data Corporation (CDC) 3200.

ESMR CHANNEL-RANGE DISPLAYS

Through orbit 3932 (31 March), the ESMR displays contained 20 swaths of data, as shown in the ESMR image displays in Section 3.3, The Nimbus 6 Data Catalog, Volume 1-5. The swaths are numbered (numbers not shown) from 1 on the left to 20 on the right. Each of the ten swaths on the left has the same geographic coverage. However, each swath displays either horizontally or vertically polarized data at a temperature range as listed in Table 3-1. The right set of ten swaths has a similar format, and displays the earliest recorded data. If the right swaths were cut and placed above the group on the left, the new display would show the continuous coverage recorded for that orbit. Swaths 1 and 11 have the same polarization and temperature range. Similarly, swaths 2 and 12, 3 and 13, etc., are the same. Table 3-1 is set up to show this duplication of parameter information.

The ESMR image display format has been modified on two occasions since launch date. The first modification occurred after orbit 3933 (31 March 1976) and the second change occurred after orbit 6184 (15 September 1976).

From orbit 3933 through orbit 6184 the ESMR image display had the following format:

The displays contain ten swaths of data plus a geographic grid overlay for each swath, as shown in the ESMR image display after orbit 3933 in Section 3.3, The Nimbus 6 Data Catalog, Volume 5 through 7. The swaths are numbered (numbers not displayed) from 1 on the left to 10 on the right. Each of the five swaths on the left has the same geographic coverage. However, each swath displays either horizontally or vertically polarized data at a temperature range as listed in Table 3-2.

The right set of five swaths has a similar format, and displays the latest recorded data. If the right swaths were cut and placed below the group on the left, the new display would show the continuous coverage of that display.

Swaths 1 and 6 display the same parameter. That is, the temperature range and polarization for swaths 1 and 6 are the same. Similarly, swaths 2 and 7, 3 and 8, 4 and 9, and 5 and 10 display the same parameters. Table 3-2 is set up to show this duplication of parameter information.

Data time (GMT) references for the left set of five swaths are shown adjacent to the vertical line at the left. Time tick marks are every five minutes with hour and minute annotation every fifteen minutes. Data time references for the right set of five swaths are shown in a similar manner adjacent to the vertical line at the right.

The center portion of the display contains two swaths of grid overlay information: the left grid for overlay on each of the five swaths on the left, and the right grid for overlay on each of the five swaths on the right. The grid longitudes are generated at ten degree intervals between 55 degrees south and 55 degrees north, and at 20 degree intervals from 55 degrees to the Poles. Latitude grids are generated every five degrees. All grid lines consist of a series of dots at one degree intervals. Latitudes are labeled at 60°S, 30°S, EQ, 30°N, and 60°N. Longitude labels are normally placed next to each latitude label.

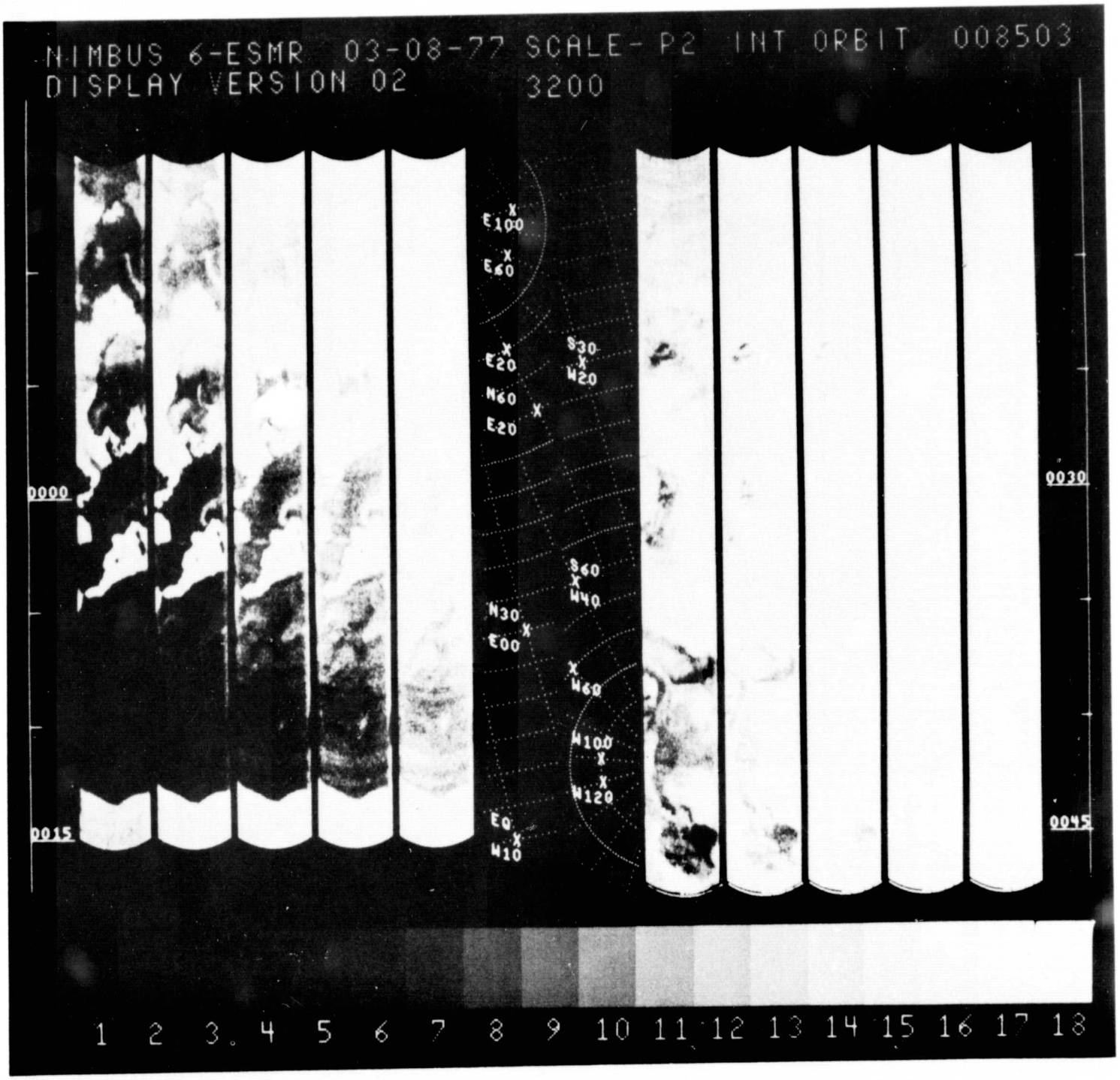
From orbit 6185 (15 September 1976) through the current data catalog period, the new ESMR image display has the following format:

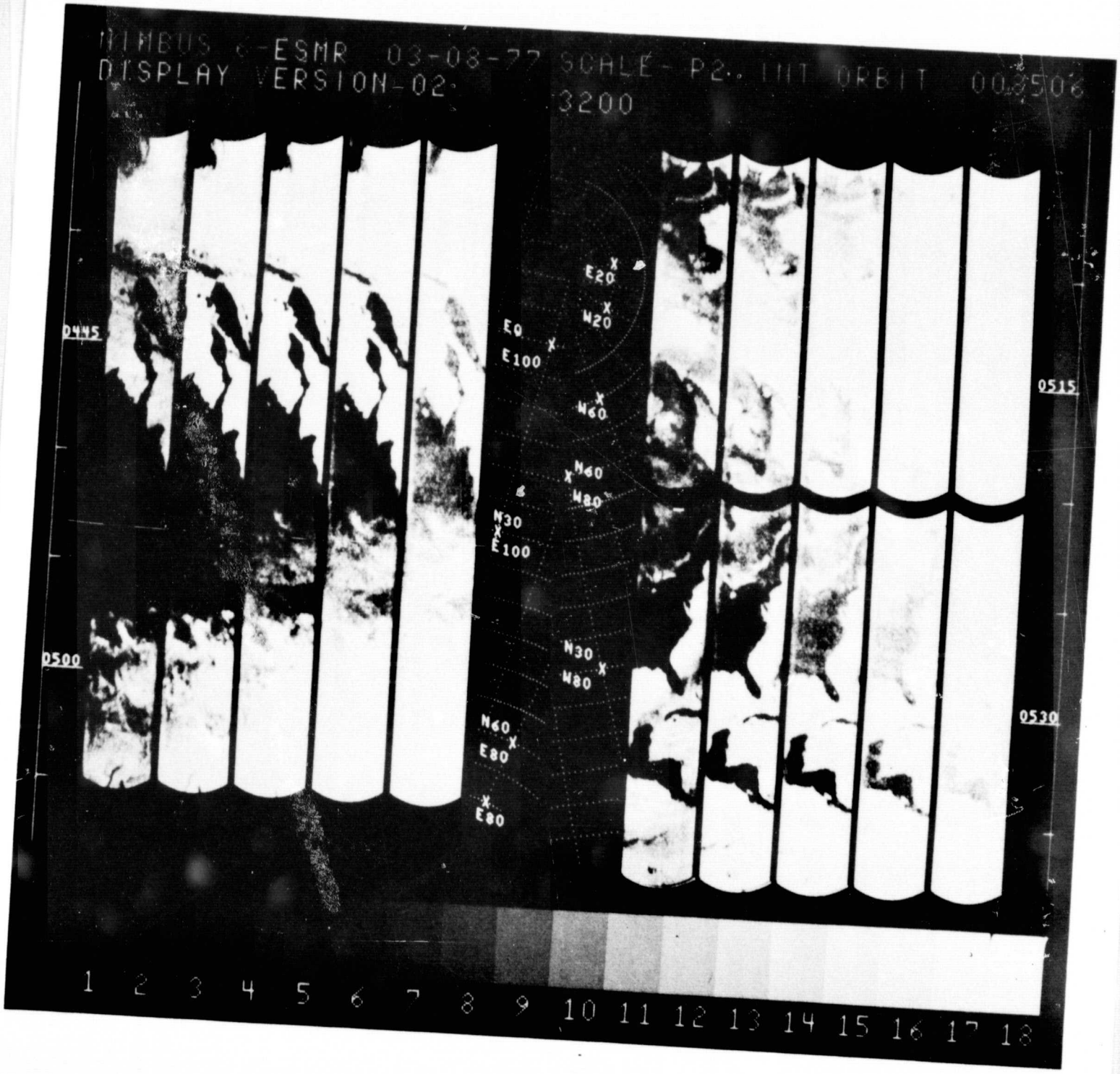
Since an anomaly renders the Horizontal channel unuseable, the new ESMR format was devised to display the Vertical channel with five different temperature ranges and polarization for each individual swarth. That is, the temperature range and polarization for swaths 1 and 6 are the same. Swaths 2 and 7, 3 and 8, 4 and 9, and 5 and 10 display the same parameters. Thus, four additional swaths of data are dedicated to the Vertical channel display for a total of 5 swaths as described above.

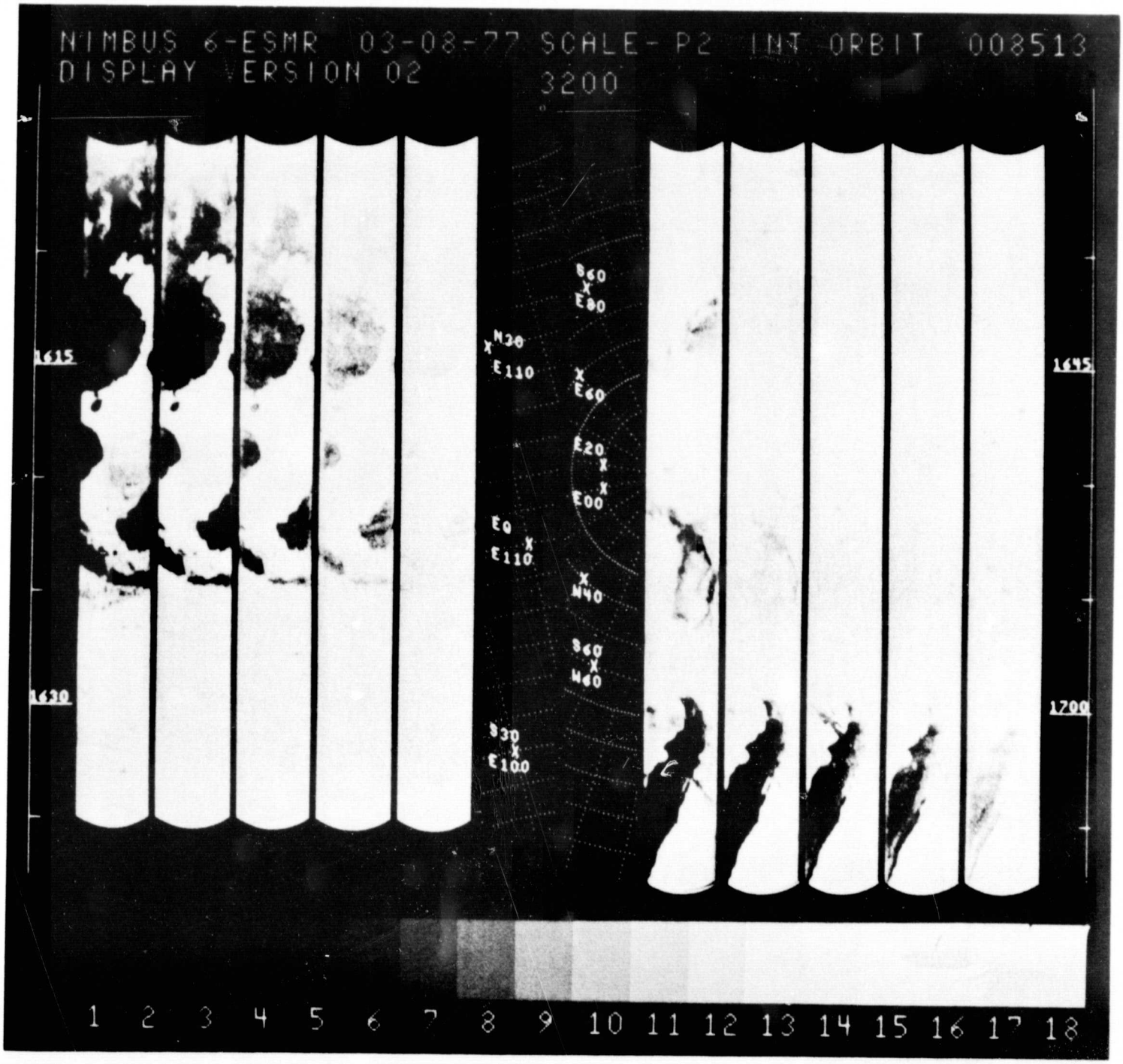
Data time (GMT) references and grid overlay information remain unchanged. Please refer to Table 3-3 for new parameter information.

SECTION 3.1

SELECTED ESMR IMAGE DISPLAYS




NIMBUS 6-ESMR 03-08-77 SCALE- P2.. UNIT ORBIT 002506
DISPLAY VERSION-02
3200
0445
0500
0515
0530
E20
W20
E0
E100
W60
N60
W80
N30
E100
N30
W80
N60
E80
E80
1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18



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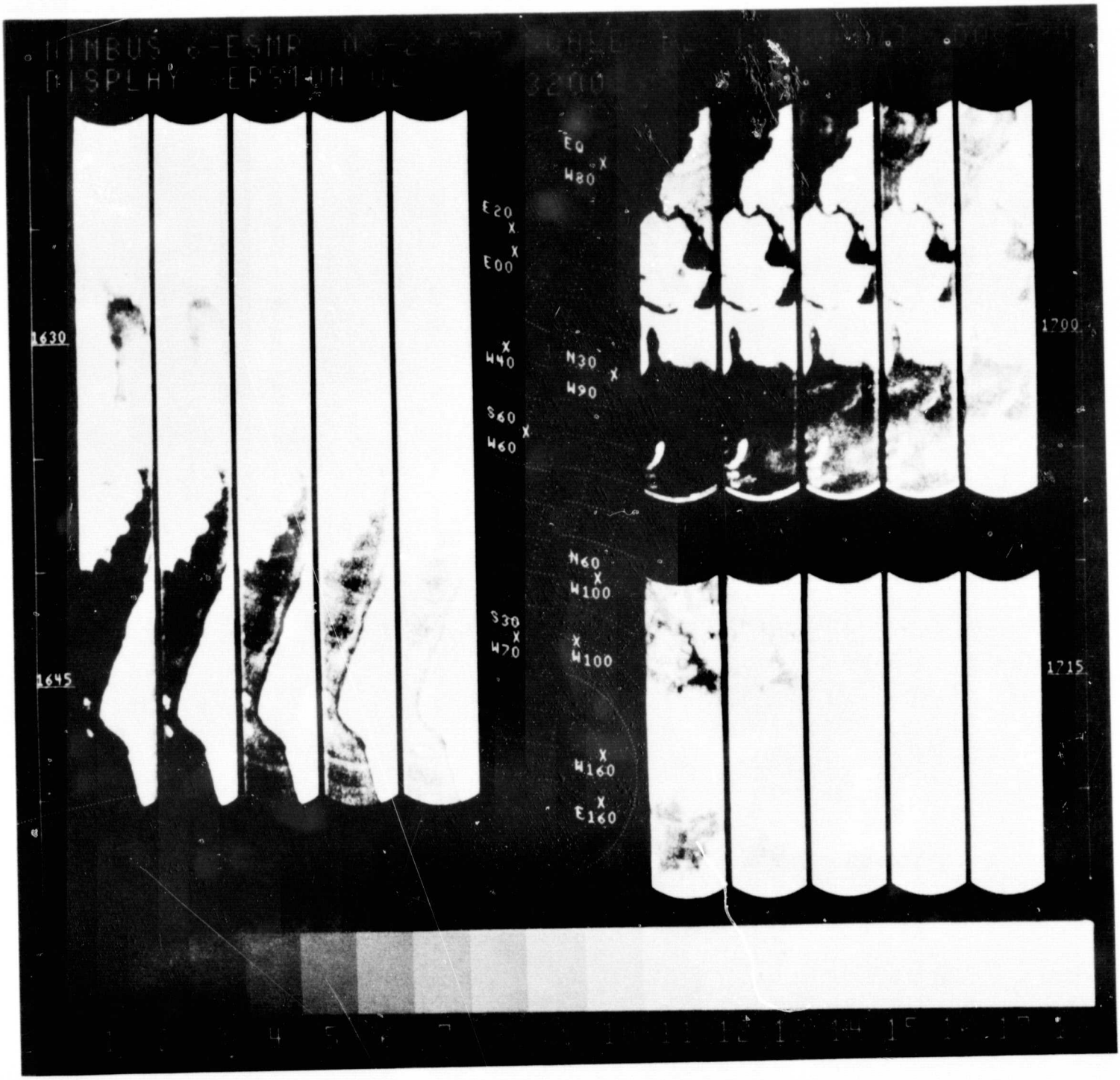
NIMBUS 6-ESMR 03-22-77 SCALE-P2 INT ORBIT 008701
DISPLAY VERSION 02
3200
1745
1800
1815
1830
EQ W100
E00 W20
W40 N30 W100
S40 W80
W60 W120
S30 W90 W120
E180
E140
1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18


E0
W80
E20
E00
1630
W40
W30
W90
S60
W60
1700
W60
W100
S30
W70
W100
1645
1715
W160
E160

SECTION 4

TEMPERATURE HUMIDITY INFRARED RADIOMETER MONTAGES

The Nimbus 6 Temperature Humidity Infrared Radiometer (THIR) subsystem is of the same design and operation as the THIR flown on Nimbus 4 and 5. The two-channel scanning radiometer measures earth radiation in two spectral bands. A 10.3 μm to 12.5 μm (11.5 μm) window channel provides an image of the cloud cover, and temperatures of the cloud tops, land, and ocean surfaces. A 6.5 μm to 7.1 μm (6.7 μm) channel provides information on the moisture content of the upper troposphere and stratosphere, and the location of jet streams and frontal systems. Ground resolution at the satellite subpoint is 8.2 km for the 11.5 μm channel and 22.5 km for the 6.7 μm channel. Both channels operate continuously to provide day and night global coverage. However, with only HDRSS recorder (B) available for part-time use on the satellite, gaps in global coverage occur over "blind" orbit areas, and sometimes over the Rosman and Alaska STDN stations, when the tape data are being transmitted to the ground. The blind orbits occur during a daytime pass over the western part of the Pacific Ocean and during a nighttime pass over the eastern part of the Atlantic Ocean. (Additionally, with the limited part-time (65 minutes) coverage by the HDRSS (B), nighttime passes north of the Equator are of limited duration.) These blind orbit areas happen when the Orroral, Australia is not available for playback of recorded data. Then the time between successive playbacks of the tape recorder becomes longer than the reduced record capability of HDRSS (B).

This section pictorially documents the data from the THIR. Section 4.1 contains all nighttime THIR 11.5 μm and 6.7 μm montages and Section 4.2 contains all daytime THIR 11.5 μm and 6.7 μm montages, arranged in chronological order. Key latitudes can be read from the superimposed grids. Grid points are identified where each swath crosses 60°N, 30°N, EQUATOR, 30°S and 60°S.

Vellum Location Guide overlays, attached to the back of this document, are to be used for general orientation with the data presented in each THIR montage. Proper alignment of the overlay grid is accomplished by matching the grid indices on the equator with the two "T" marks on each montage.

THIR photographic data and/or digital data can be ordered through the National Space Science Data Center (NSSDC), Code 601, Goddard Space Flight Center, Greenbelt, Maryland 20771.

THIR photographic data consist of 70 mm film strips produced from the radiometer output signals. The gray shades in each image correspond to temperature variations of the land, sea, and clouds. On a film positive the lightest tones represent cold temperatures, while the darkest tones represent warm temperatures. THIR photographic data are archived in separate 6.7 μm and 11.5 μm daytime and nighttime swaths. The approximate coverage of a full swath is from pole to pole.

When ordering THIR photographic data from NSSDC the following information should be given:

- Satellite (e. g. Nimbus 6)
- Date of data
- Data orbit number, channel (11. 5 μm or 6. 7 μm), and whether day or night data
- Data format, i. e. , positive or negative transparencies, or prints
- Area of interest defined by latitude and longitude

In addition to the THIR film strips, photographic copies of the daily day or night montages prepared from film strips can be obtained.

Quantitative digital data are obtained when the original analog signals are digitized with full fidelity, and processed by an IBM 360 computer, where calibration and geographic referencing are applied. Each reduced radiation data tape prepared by the IBM 360 is called a Nimbus Meteorological Radiation Tape-THIR (NMRT-THIR). The NMRT can be used to generate grid print maps or to accomplish special scientific analyses. The format of this tape may be found in The Nimbus 6 User's Guide, Section 2.

Due to the large volume and the long computer running time required for processing THIR into NMRTs, Nimbus 6 THIR digital data are not routinely reduced to final NMRT format. Only those data which are specifically requested by the user will be processed. Requests should be made through NSSDC. The user is urged to make full use of the film strips which are abundantly available in nearly real time from the NSSDC.

A series of programs at GSFC produce printed and contoured data referenced to a grid on Polar Stereographic or Mercator map bases. These are called grid print maps. The advantages of the grid print map presentation are the display of absolute values of temperatures in their approximate location and geographical rectification of the data. Grid print maps may be produced for either a single orbit or a composite of several orbits. The following standard options are available and should be specified when requesting grid print maps from NSSDC.

- Map and Approximate Scale
  a. Polar Stereographic, 1:30 million
  b. Polar Stereographic, 1:10 million
  c. Multi-resolution Mercator maps are available down to 1:1 million scale.

- Maximum Scan Angle (50 degrees is practical limit)

- Field Values and Contouring. Unless otherwise specified, all maps will include field values and contouring except Mercator maps of scales larger than 1:20 million. A data population map, indicating the number of individual measurements contained in each grid point average, as well as a latitude-longitude description for geographically locating the data, will be provided along with each grid print map.

When ordering grid print map data, the following identifying information should be given:

- Satellite (e.g., Nimbus 6)
- Sensor (THIR)
- Channel (6.7 μm or 11.7 μm)
- Data Orbit Number
- Calendar Date of Equator Crossing
- Beginning and Ending Times of Data in GMT
- Latitude and Longitude Limits of Area of Interest
- Map Type and Map Scale
- Scan Angle Limits
- Contouring or No Contouring of Data Points

When ordering NMRTs, the "Calendar Date of Equator Crossing" and "Map type and Map Scale" can be omitted.

Beginning and ending times of data in GMT can be interpolated using Table 4-1 which gives the elapsed time from either ascending or descending node as a function of latitude. These elapsed time values can be appropriately added or subtracted from node times given in Table 2-2.

A complete description of the THIR experiment may be found in The Nimbus 6 User's Guide, Section 2.

Table 4-1

Latitude Versus Minutes From
Ascending or Descending Node

Latitude from AN or DN	Minutes and Seconds from AN or DN
0	0:00
5	1:31
10	3:02
15	4:33
20	6:03
25	7:34
30	9:05
35	10:36
40	12:08
45	13:40
50	15:12
55	16:44
60	18:18
65	19:52
70	21:33
75	23:26
78	24:44
80.1	26:49
78	29:00
75	30:09
70	31:51
65	33:35

SECTION 4.1

TEMPERATURE HUMIDITY INFRARED RADIOMETER

NIGHTTIME MONTAGES

8422 8421 8420 8419 8418 8417 8416 8415 8414 8413 8412 8411 8410

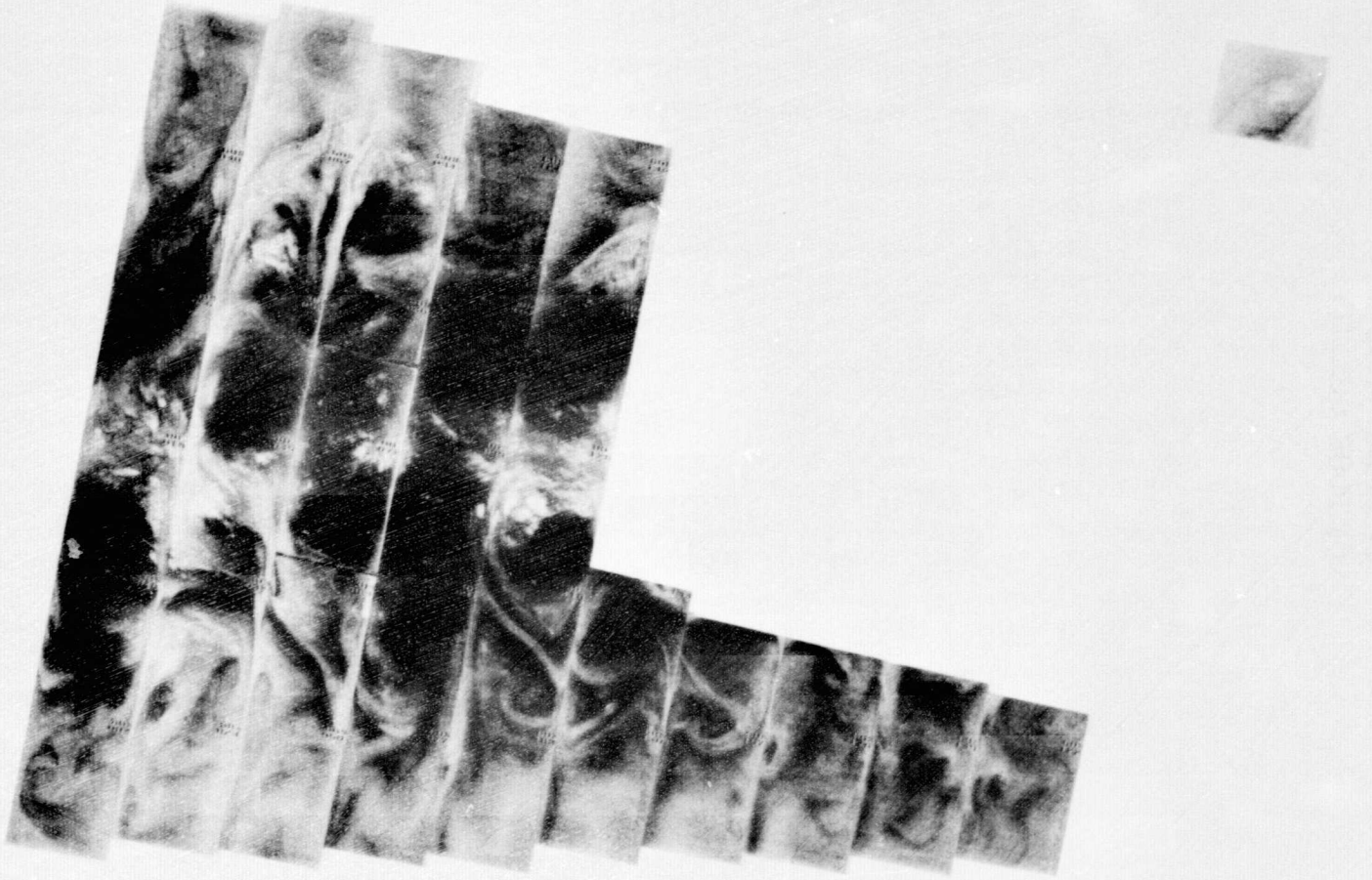
1 MAR 77

6.7 μm

8422 8421 8420 8419 8418 8417 8416 8415 8414 8413 8412 8411 8410

1 MAR 77

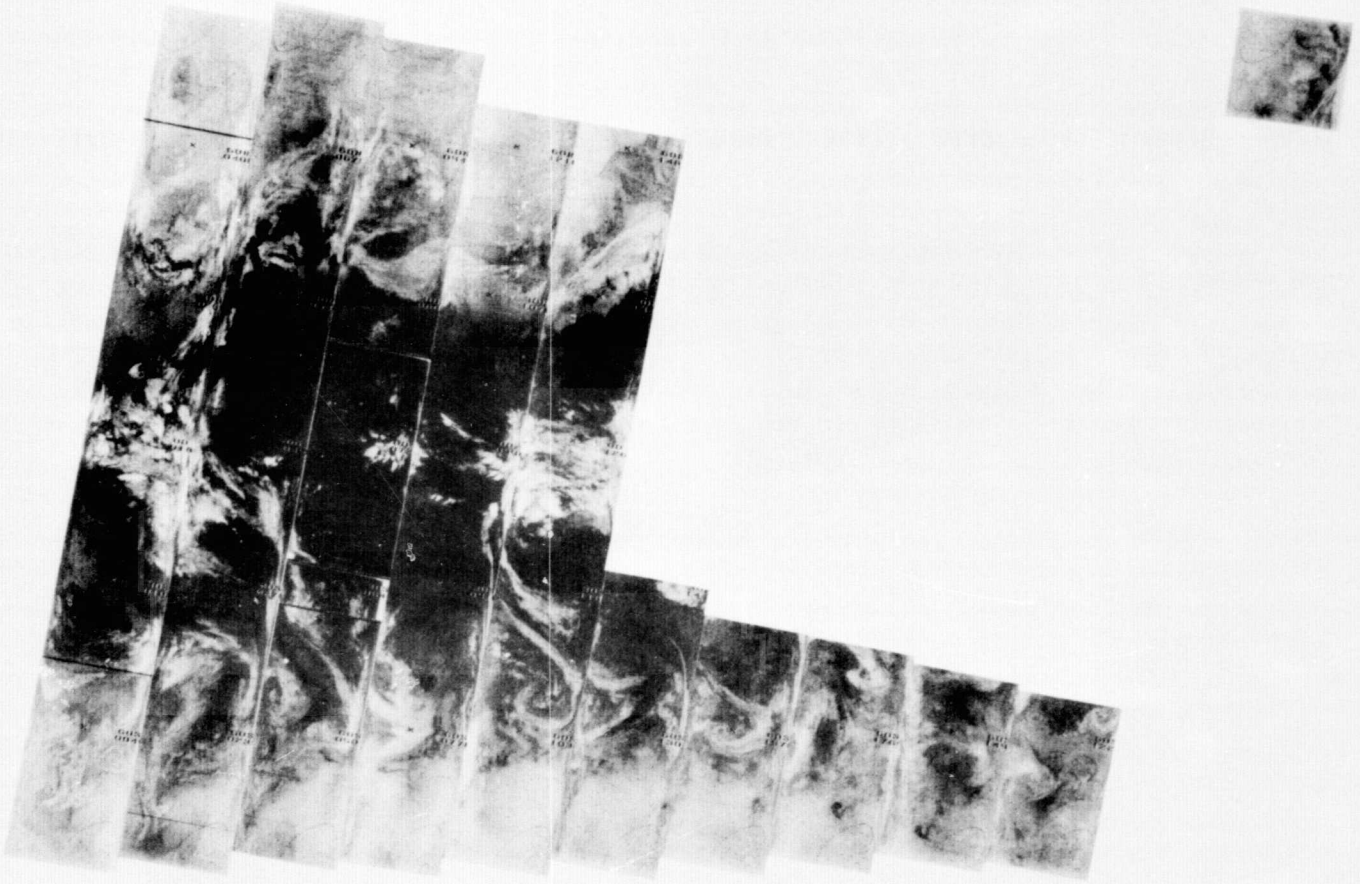
11.5 μm



8436 8435 8434 8433 8432 8431 8430 8429 8428 8427 8426 8425 8424 8423

2 MAR 77

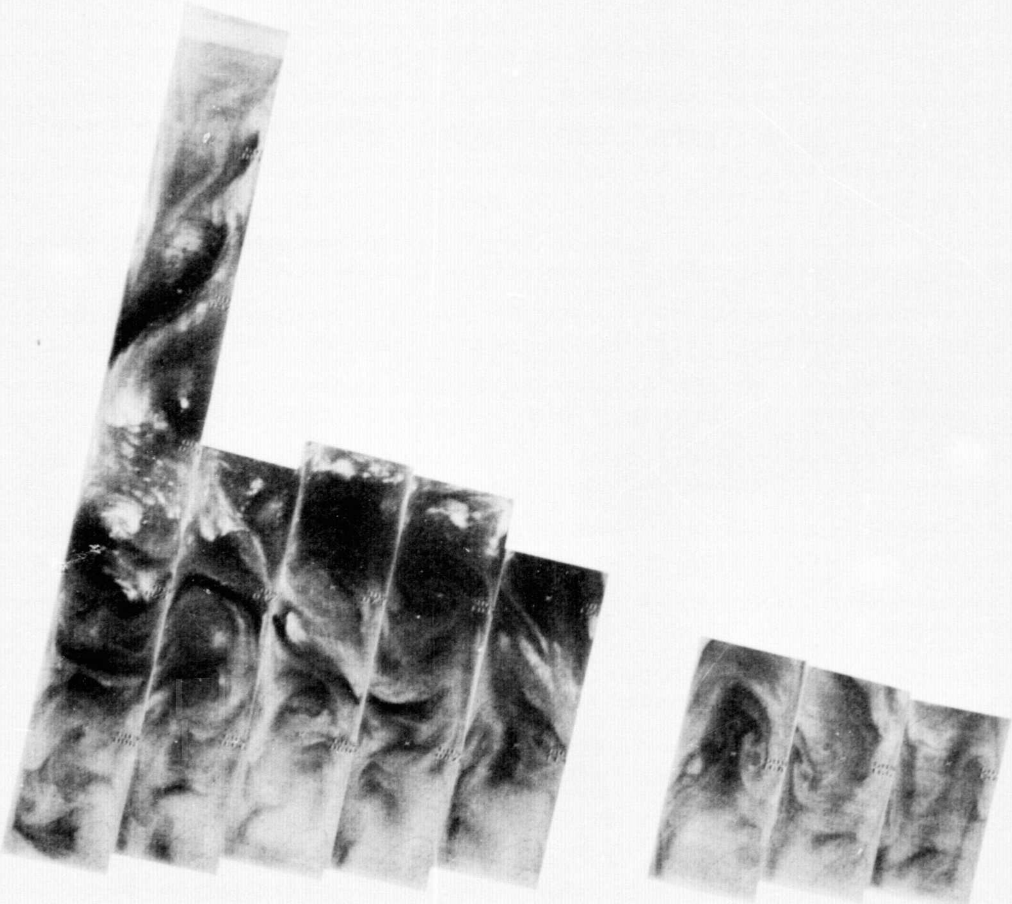
6.7 μm



8436 8435 8434 8433 8432 8431 8430 8429 8428 8427 8426 8425 8424 8423

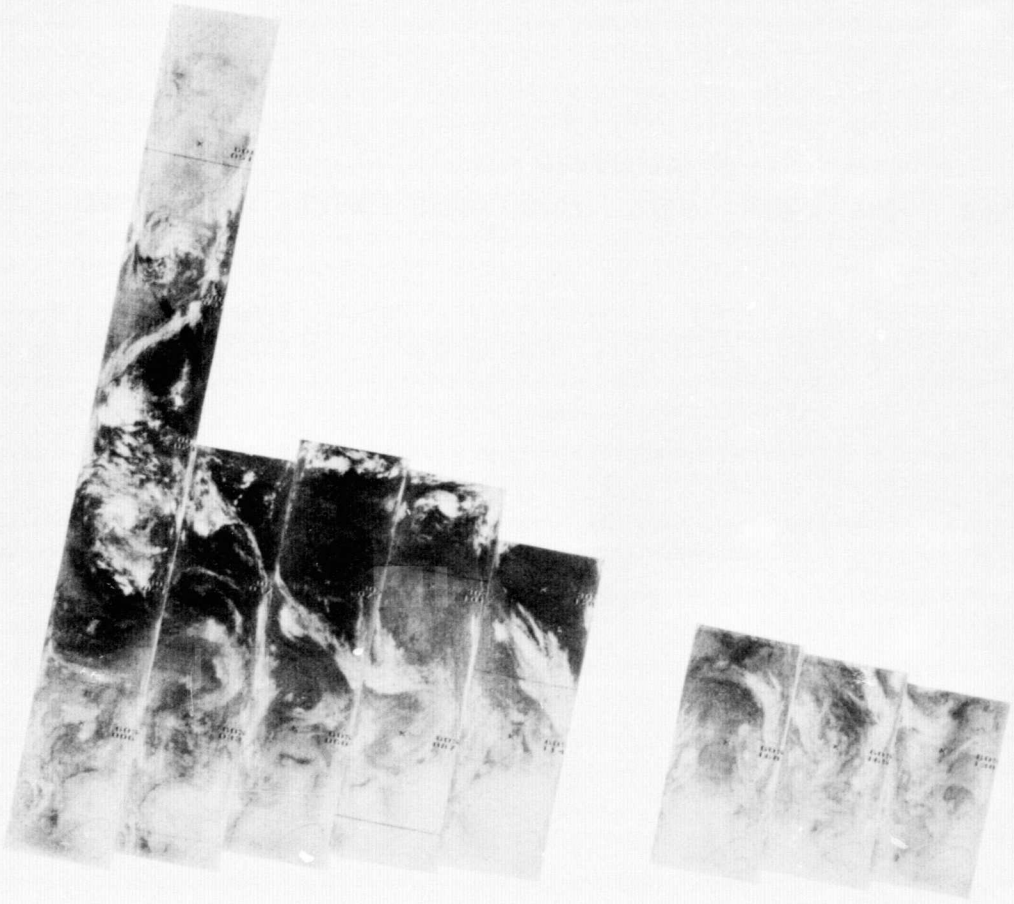
2 MAR 77

11.5 μm



3 MAR 77

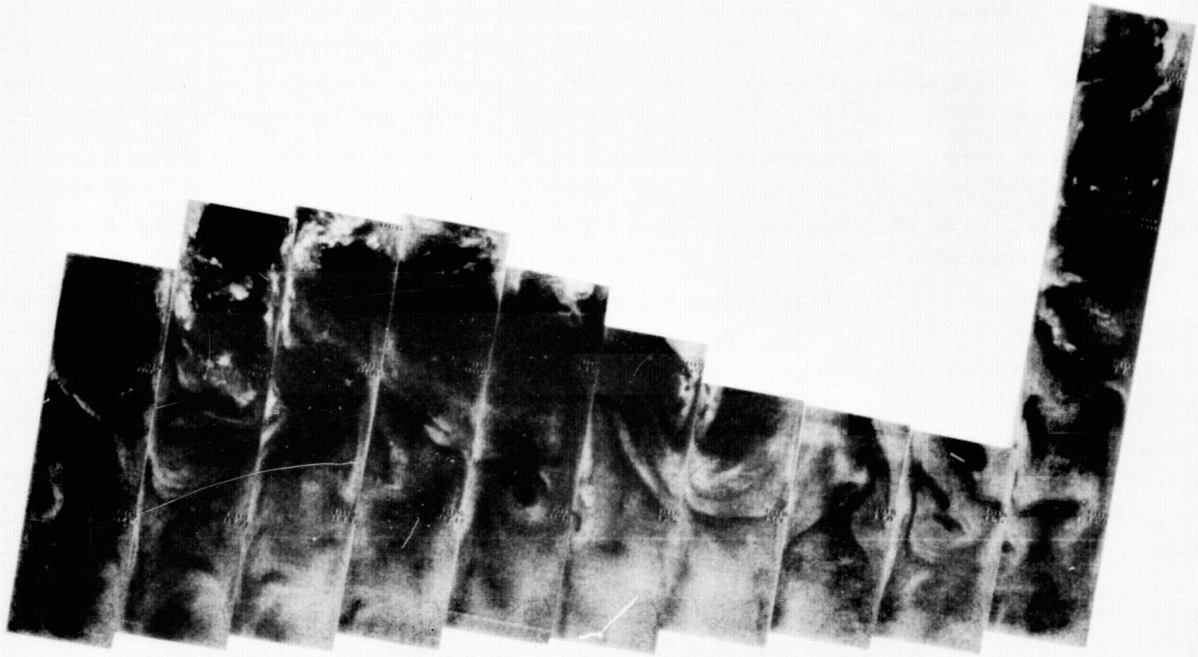
6.7 μm



8449 8448 8447 8446 8445 8444 8443 8442 8441 8440 8439 8438 8437

3 MAR 77

11.5 μm



8463 8462 8461 8460 8459 8458 8457 8456 8455 8454 8453 8452 8451 8450

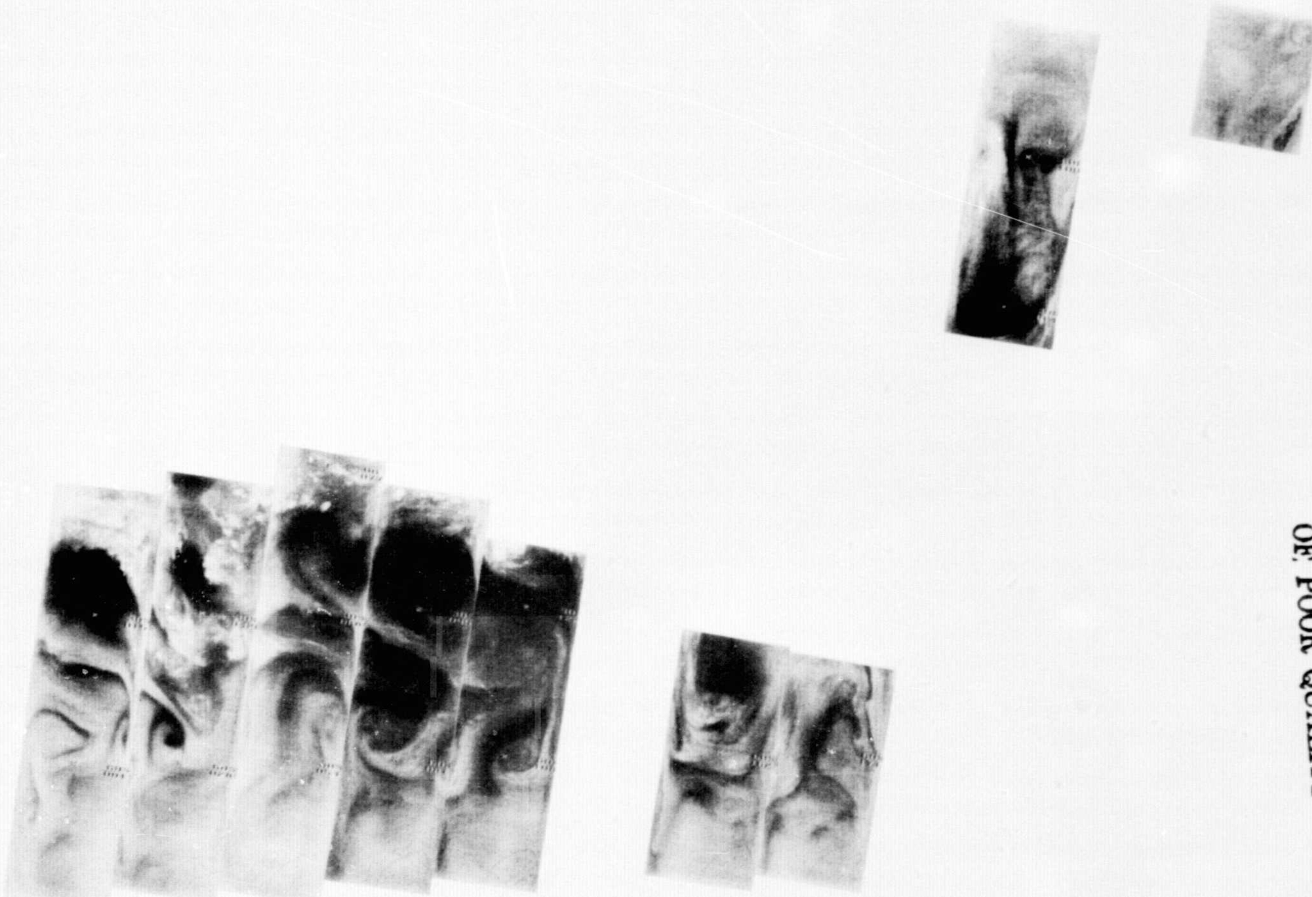
4 MAR 77

6.7 μm

8463 8462 8461 8460 8459 8458 8457 8456 8455 8454 8453 8452 8451 8450

4 MAR 77

11.5 μm



8476 8475 8474 8473 8472 8471 8470 8469 8468 8467 8466 8465 8464

5 MAR 77

6.7 μm

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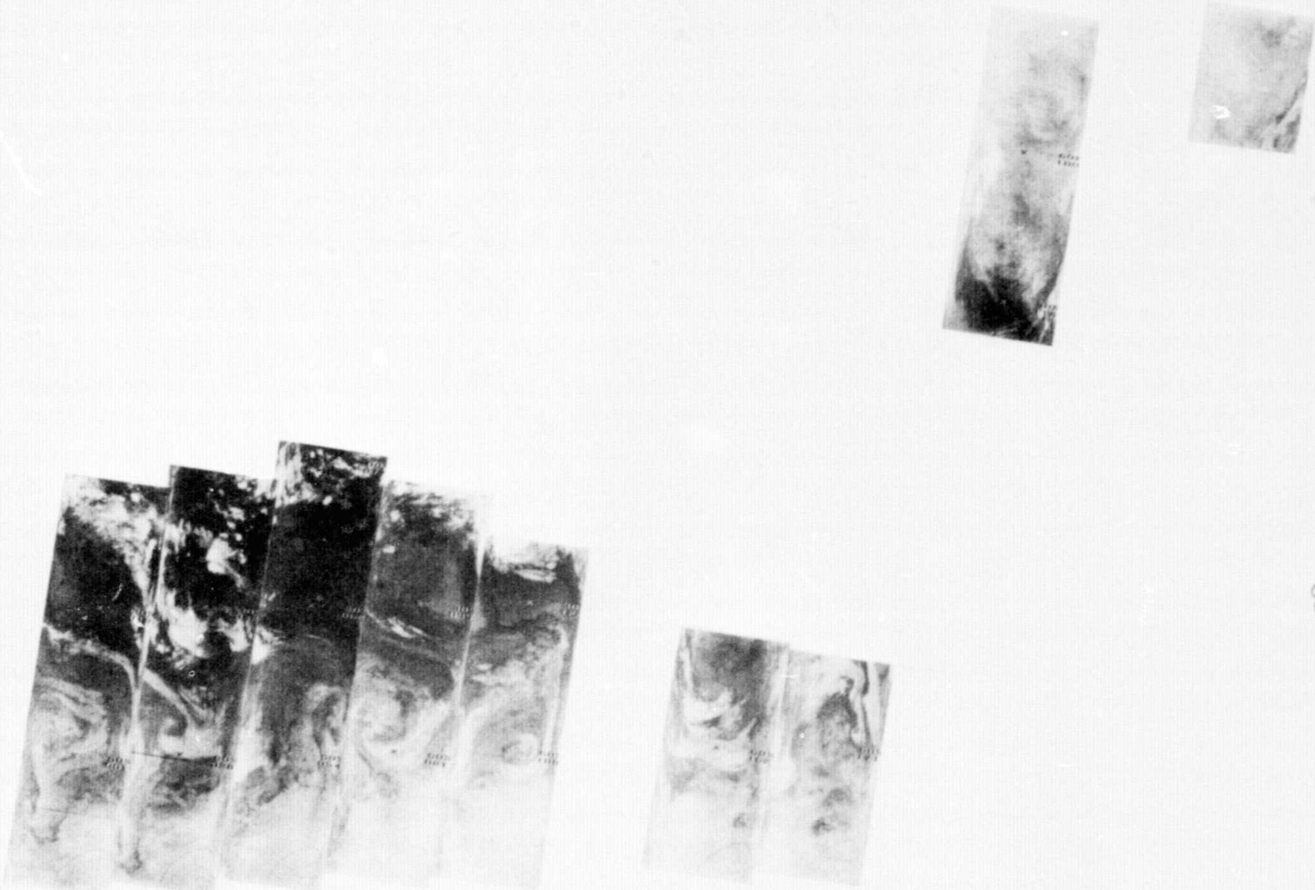
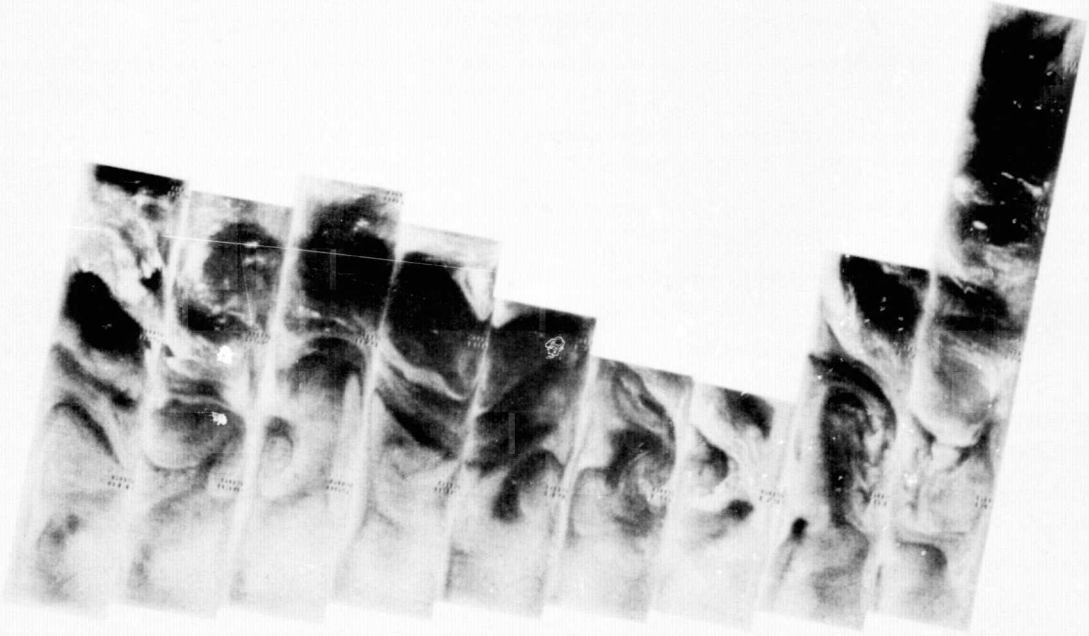


8476 8475 8474 8473 8472 8471 8470 8469 8468 8467 8466 8465 8464

5 MAR 77

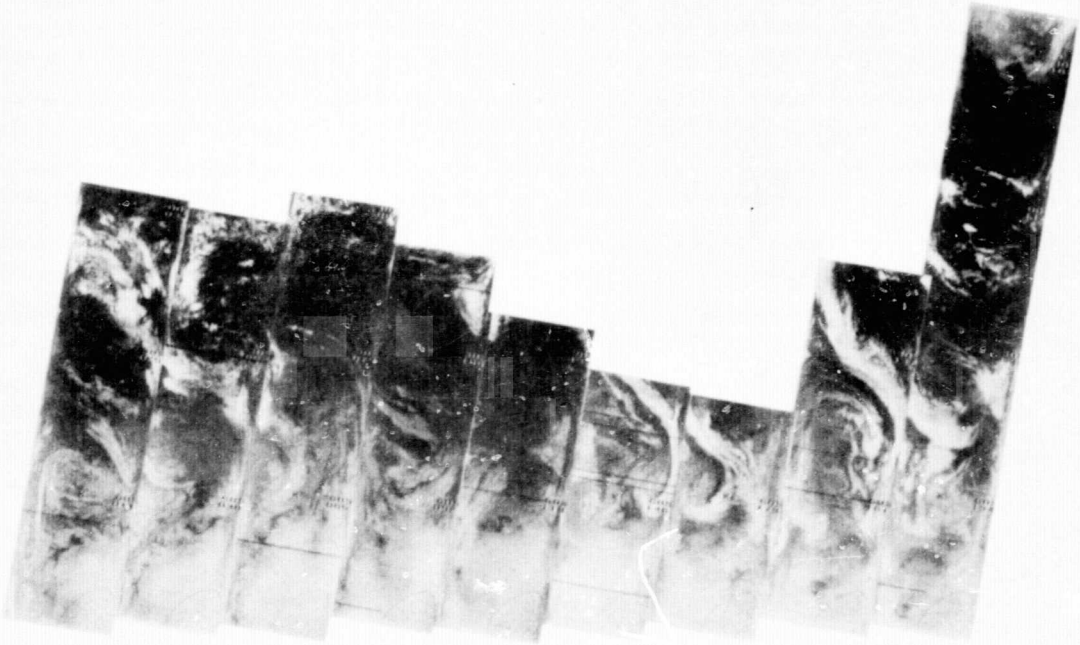
11.5 μm



8489 8488 8487 8486 8485 8484 8483 8482 8481 8480 8479 8478 8477

6 MAR 77

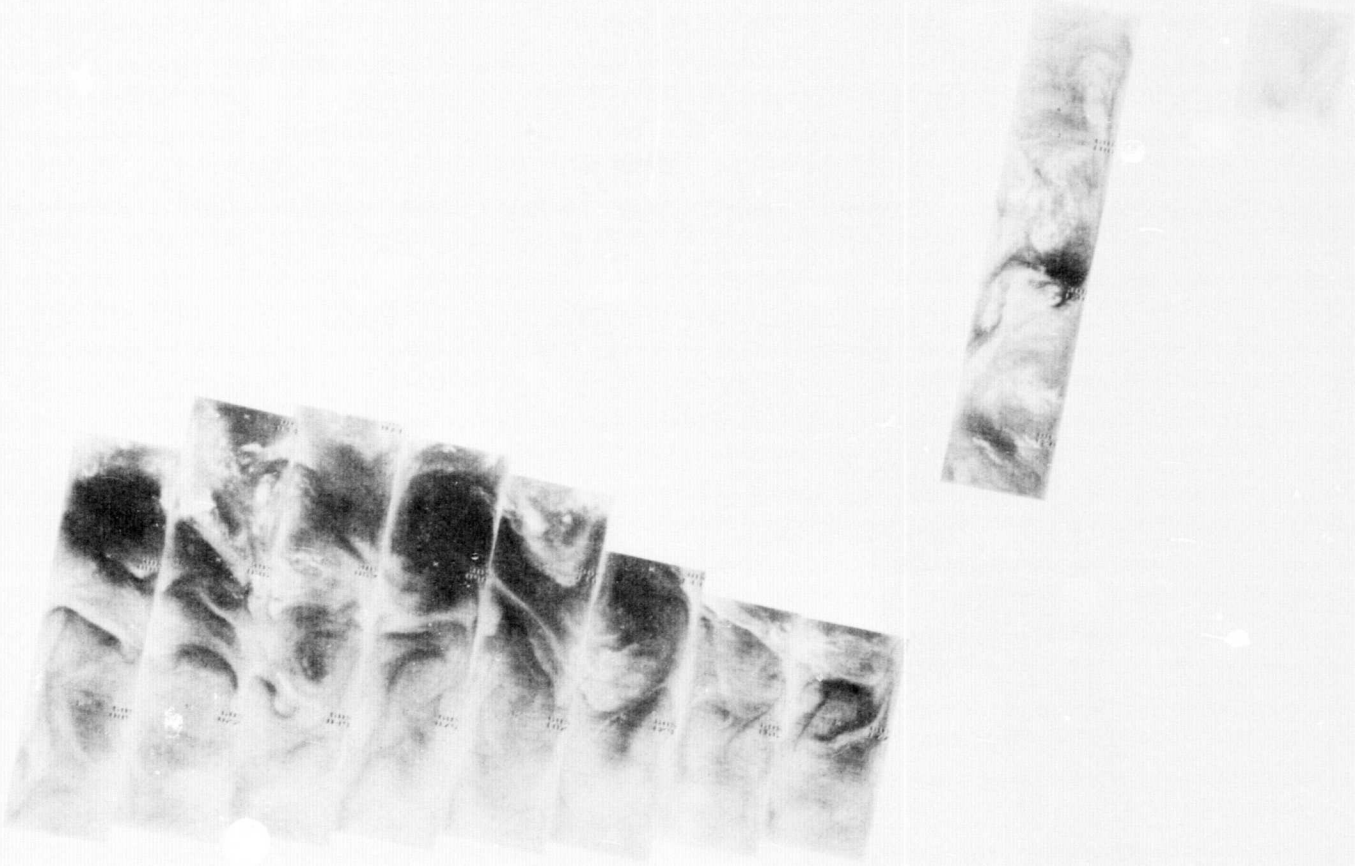
6.7 μm



8489 8488 8487 8486 8485 8484 8483 8482 8481 8480 8479 8478 8477

6 MAR 77

11.5 μm



8503 8502 8501 8500 8499 8498 8497 8496 8495 8494 8493 8492 8491 8490

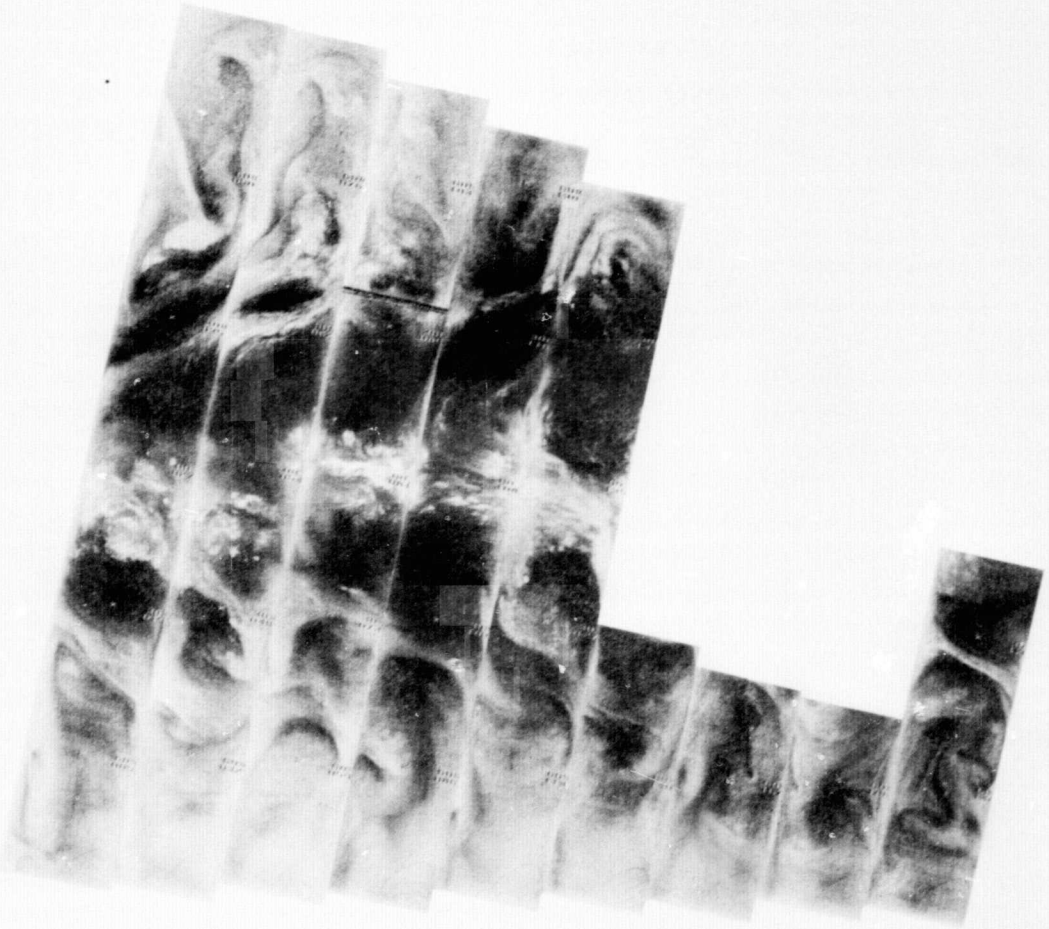
7 MAR 77

6.7 μm

8503 8502 8501 8500 8499 8498 8497 8496 8495 8494 8493 8492 8491 8490

7 MAR 77

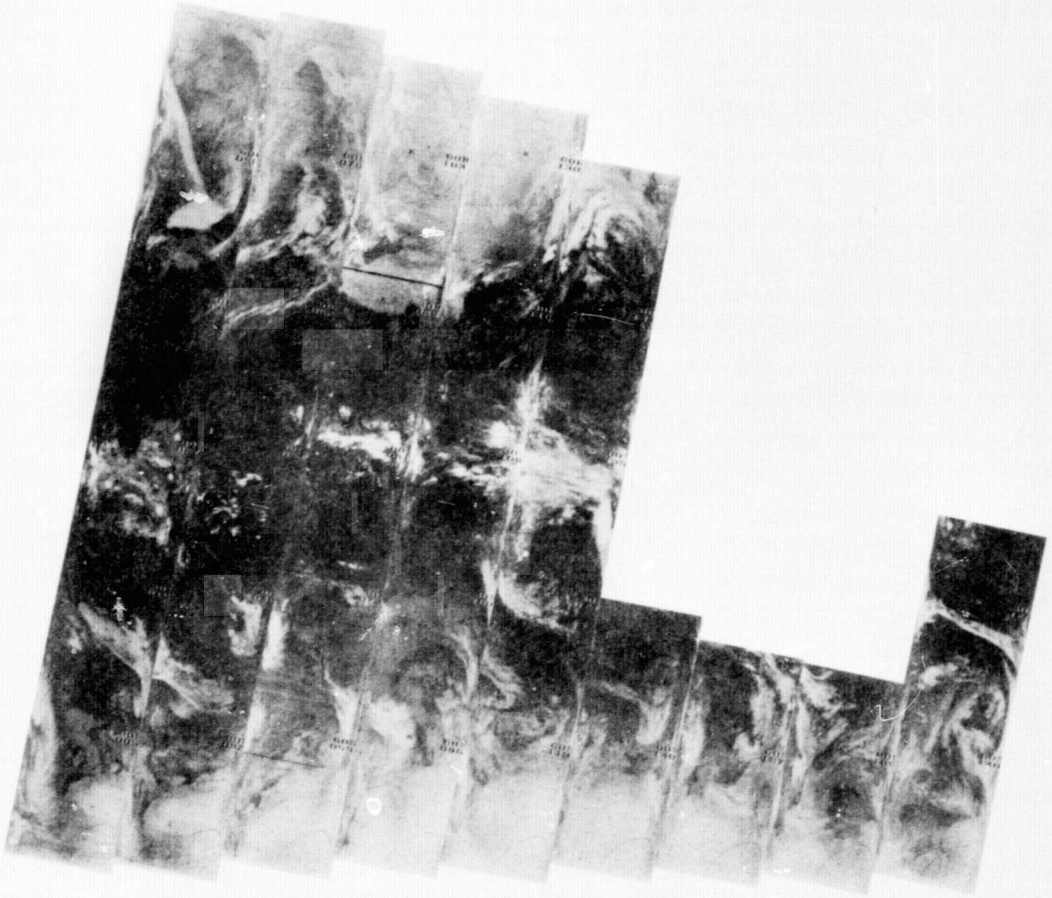
11.5 μm



8516 8515 8514 8513 8512 8511 8510 8509 8508 8507 8506 8505 8504

8 MAR 77

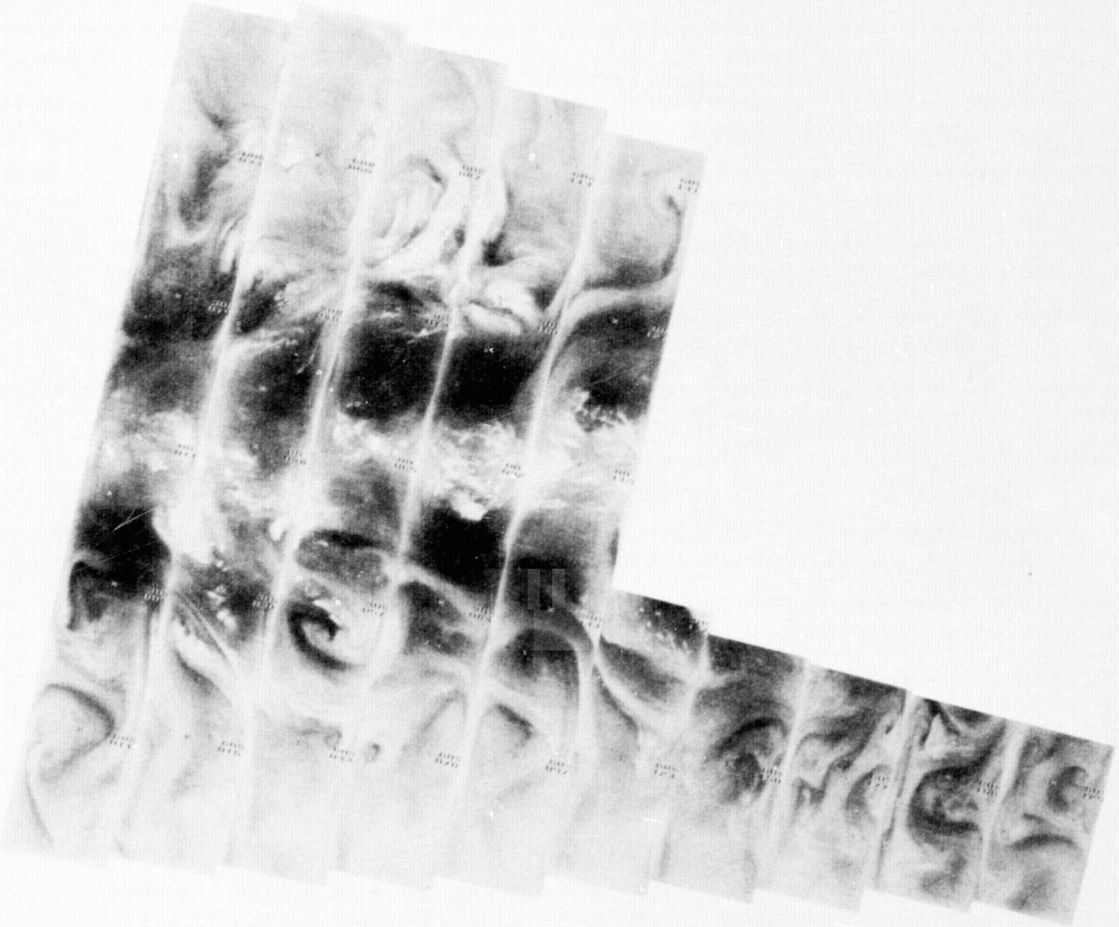
6.7 μm



8516 8515 8514 8513 8512 8511 8510 8509 8508 8507 8506 8505 8504

8 MAR 77

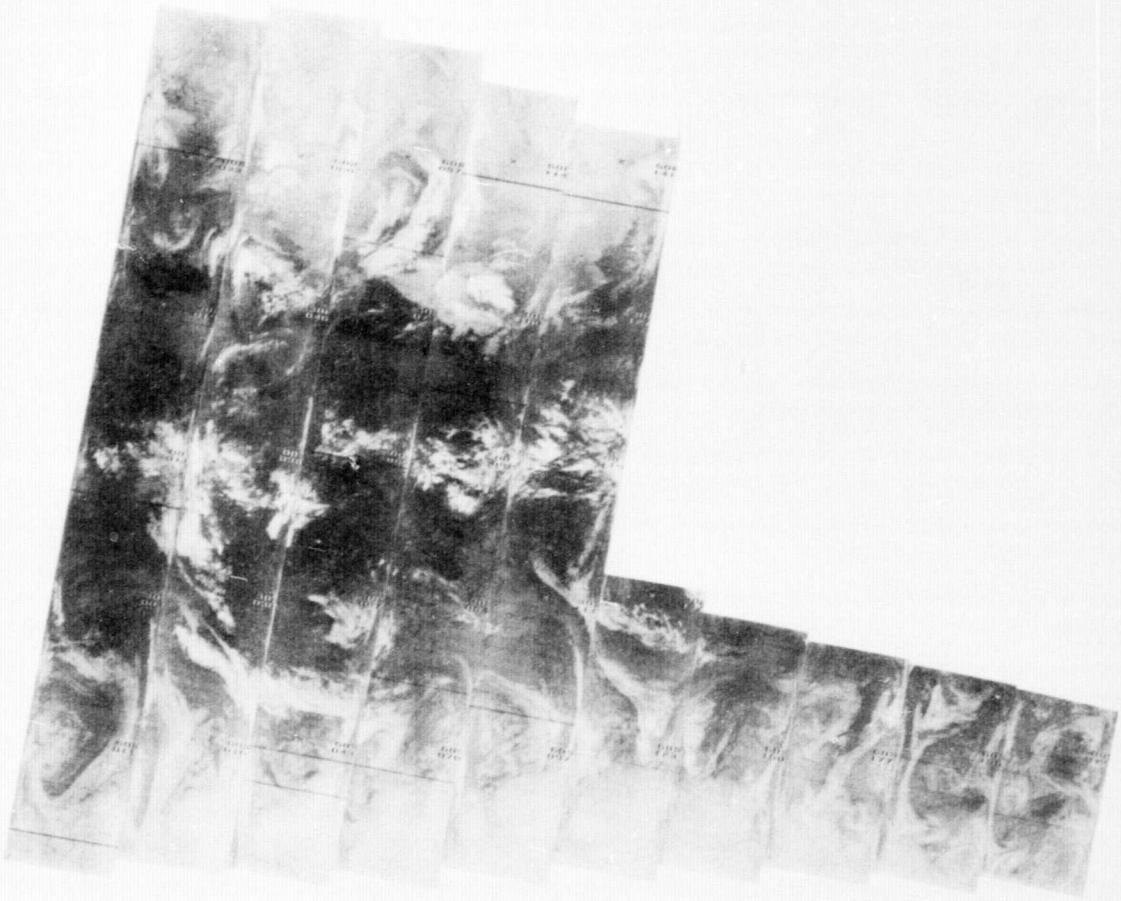
11.5 μm



8530 8529 8528 8527 8526 8525 8524 8523 8522 8521 8520 8519 8518 8517

9 MAR 77

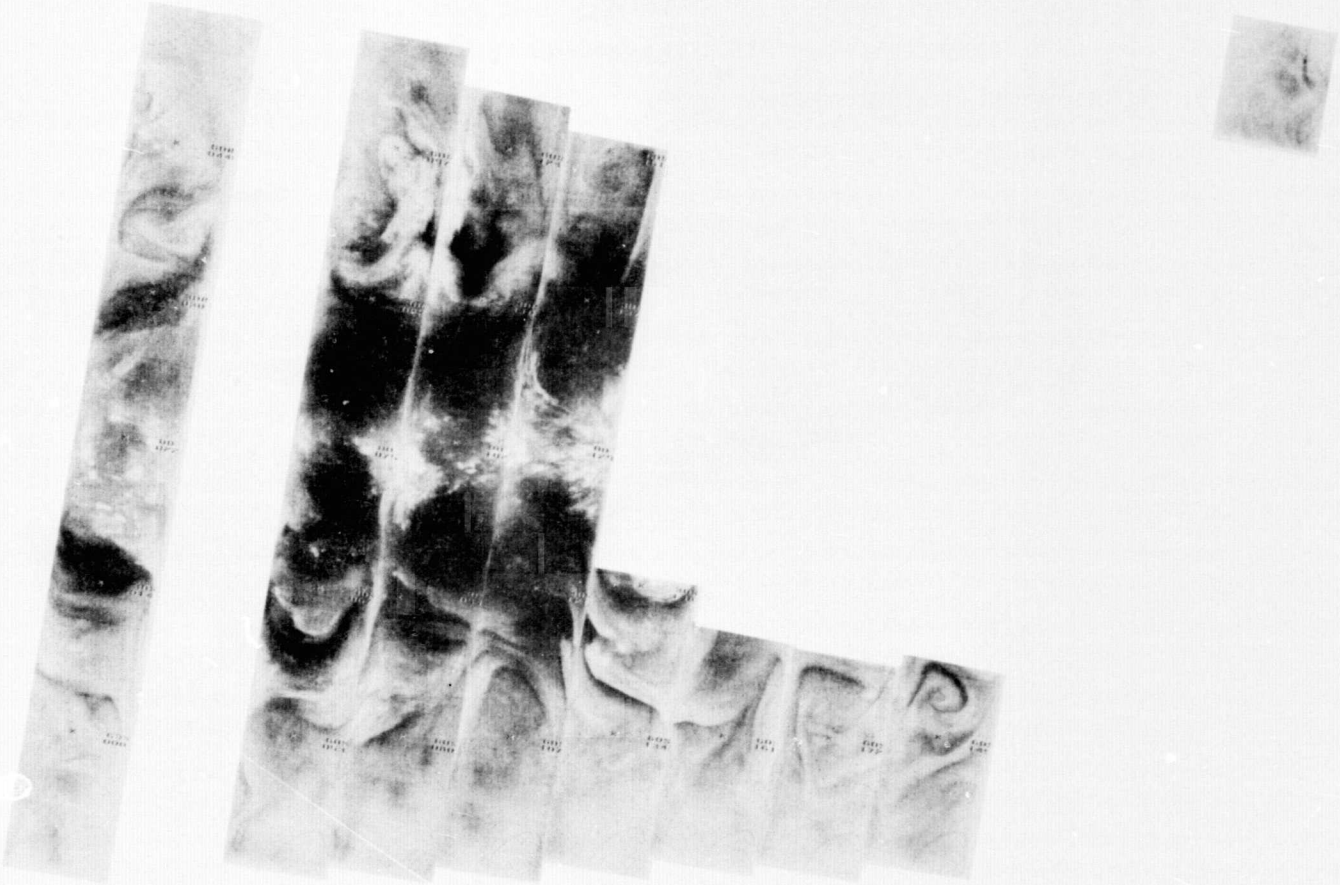
6.7 μm



8530 8529 8528 8527 8526 8525 8524 8423 8422 8521 8520 8519 8518 8517

9 MAR 77

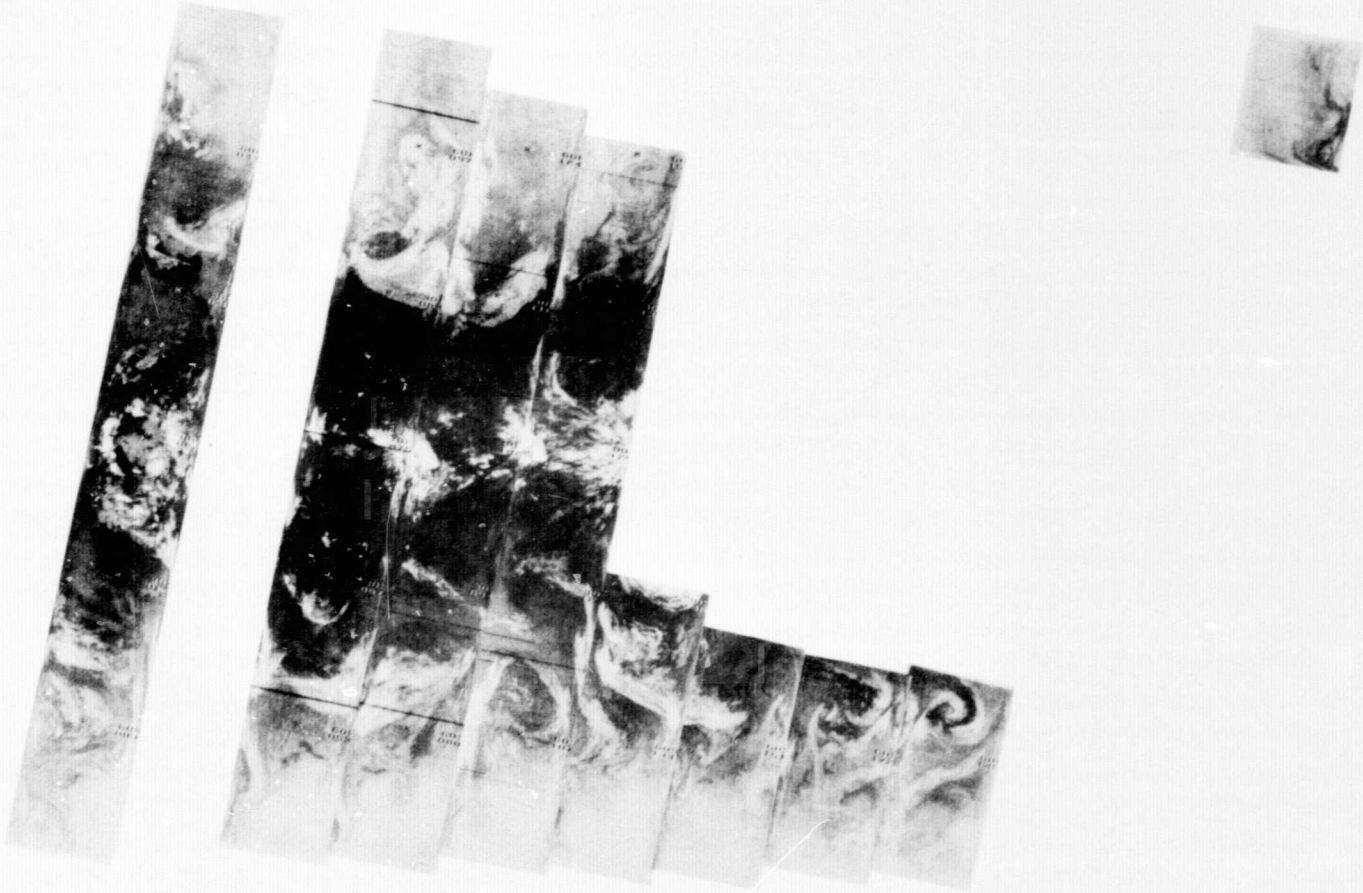
11.5 μm



8543 8542 8541 8540 8539 8538 8537 8536 8535 8534 8533 8532 8531

10 MAR 77

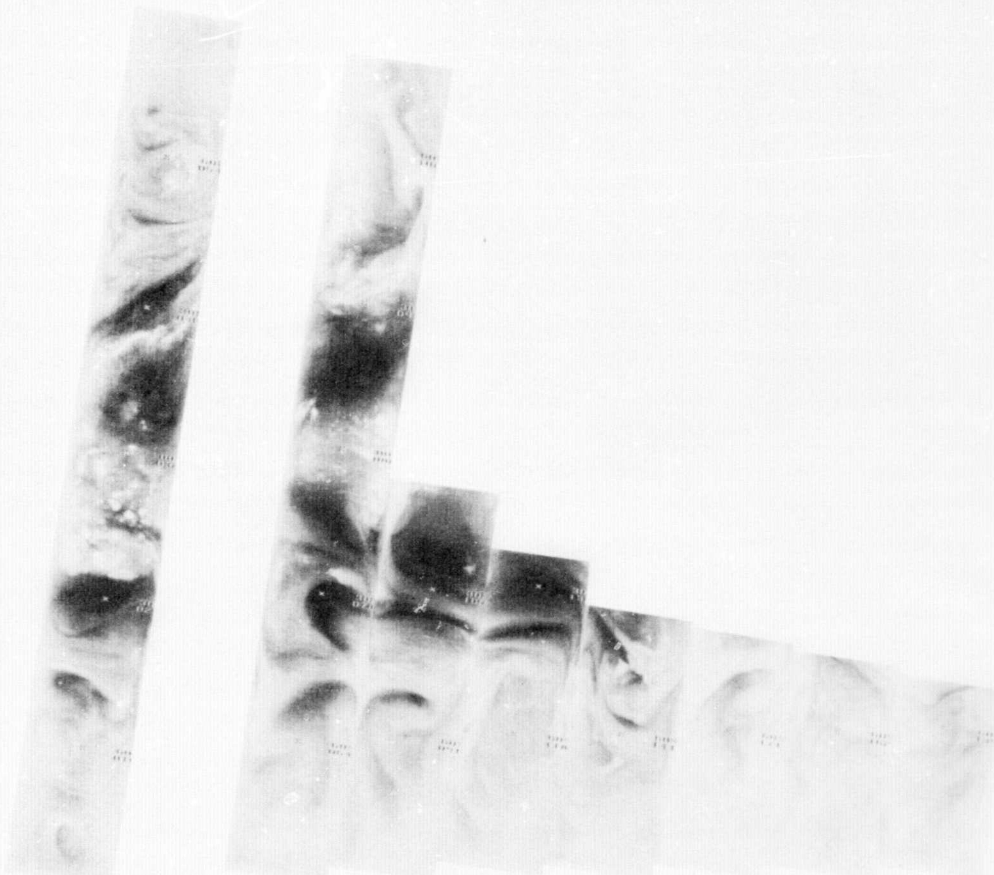
6.7 μm



8543 8542 8541 8540 8539 8538 8537 8536 8535 8534 8533 8532 8531

10 MAR 77

11.5 μm



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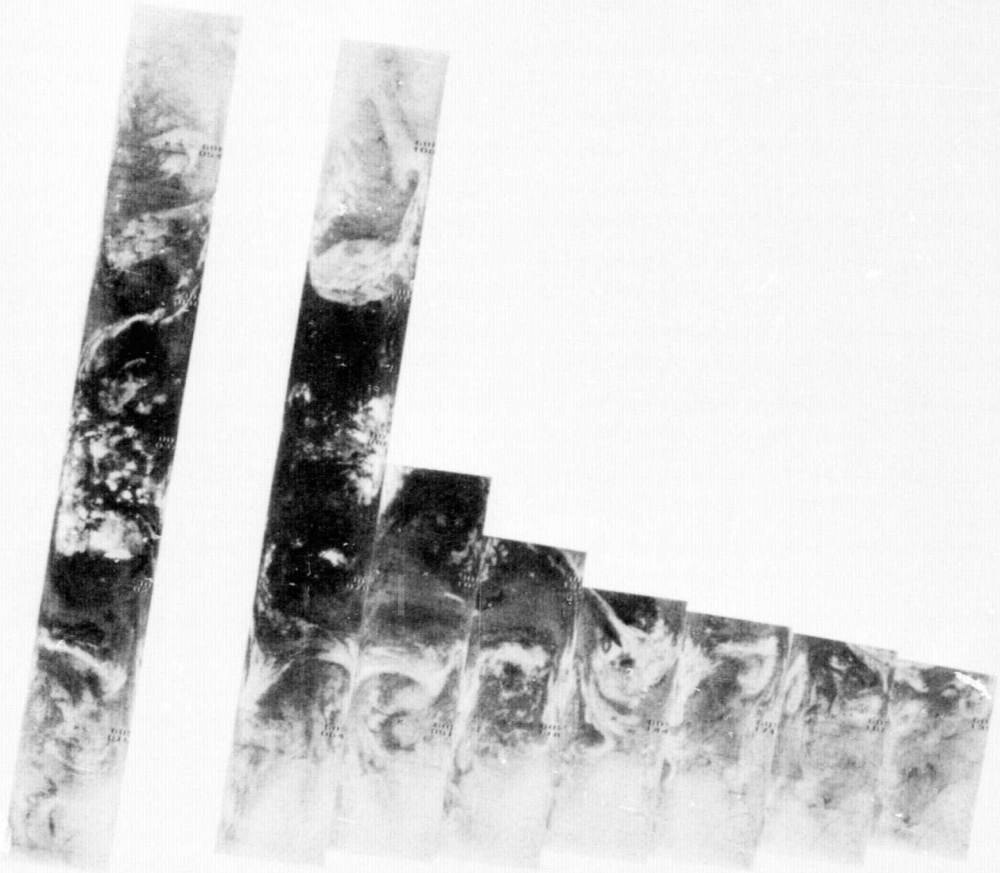
11 MAR 77

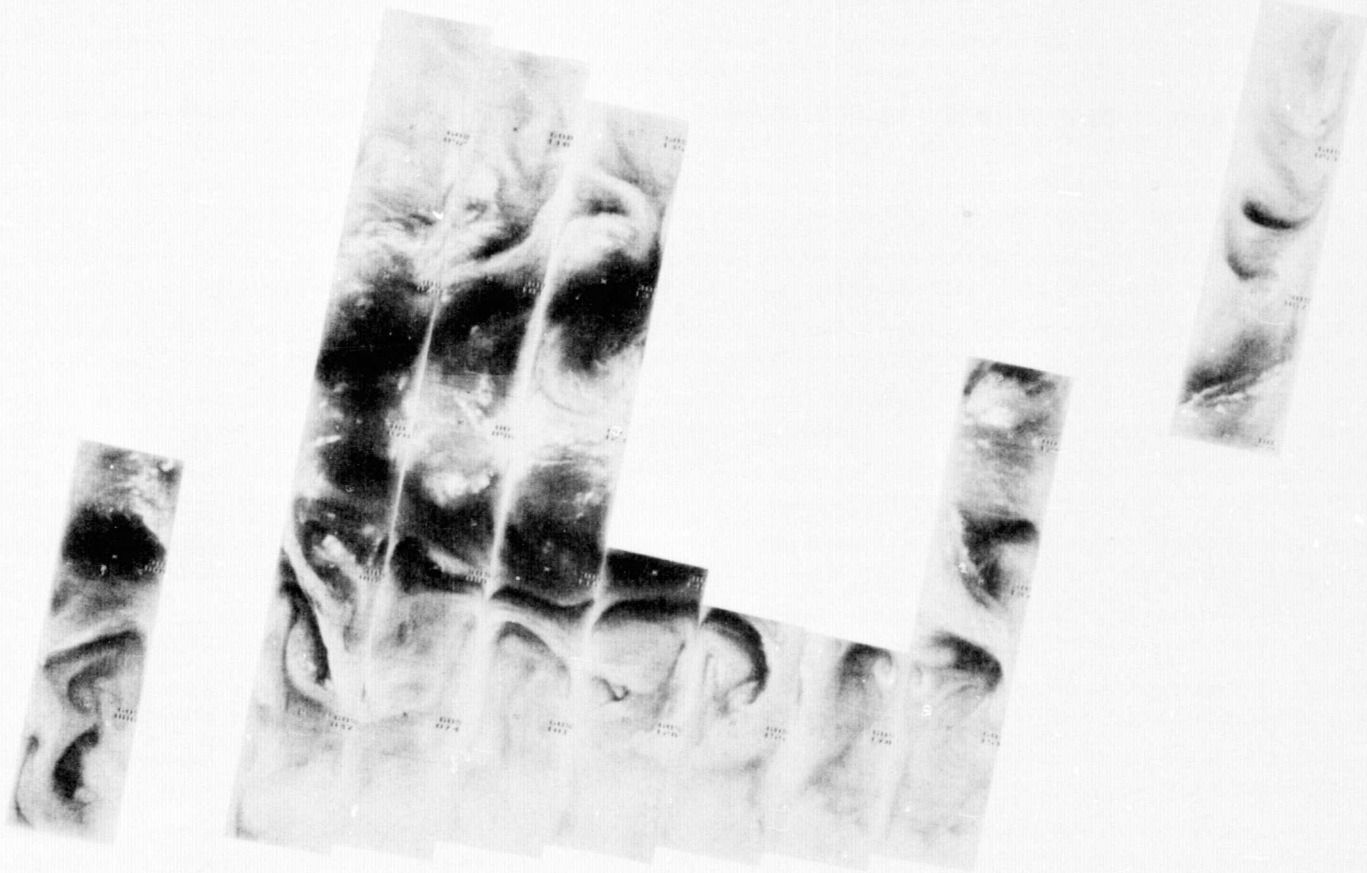
6.7 μm



8556 8555 8554 8553 8552 8551 8550 8549 8548 8547 8546 8545 8544

11 MAR 77

11.5 μm



8570 8569 8568 8567 8566 8565 8564 8563 8562 8561 8560 8559 8558 8557

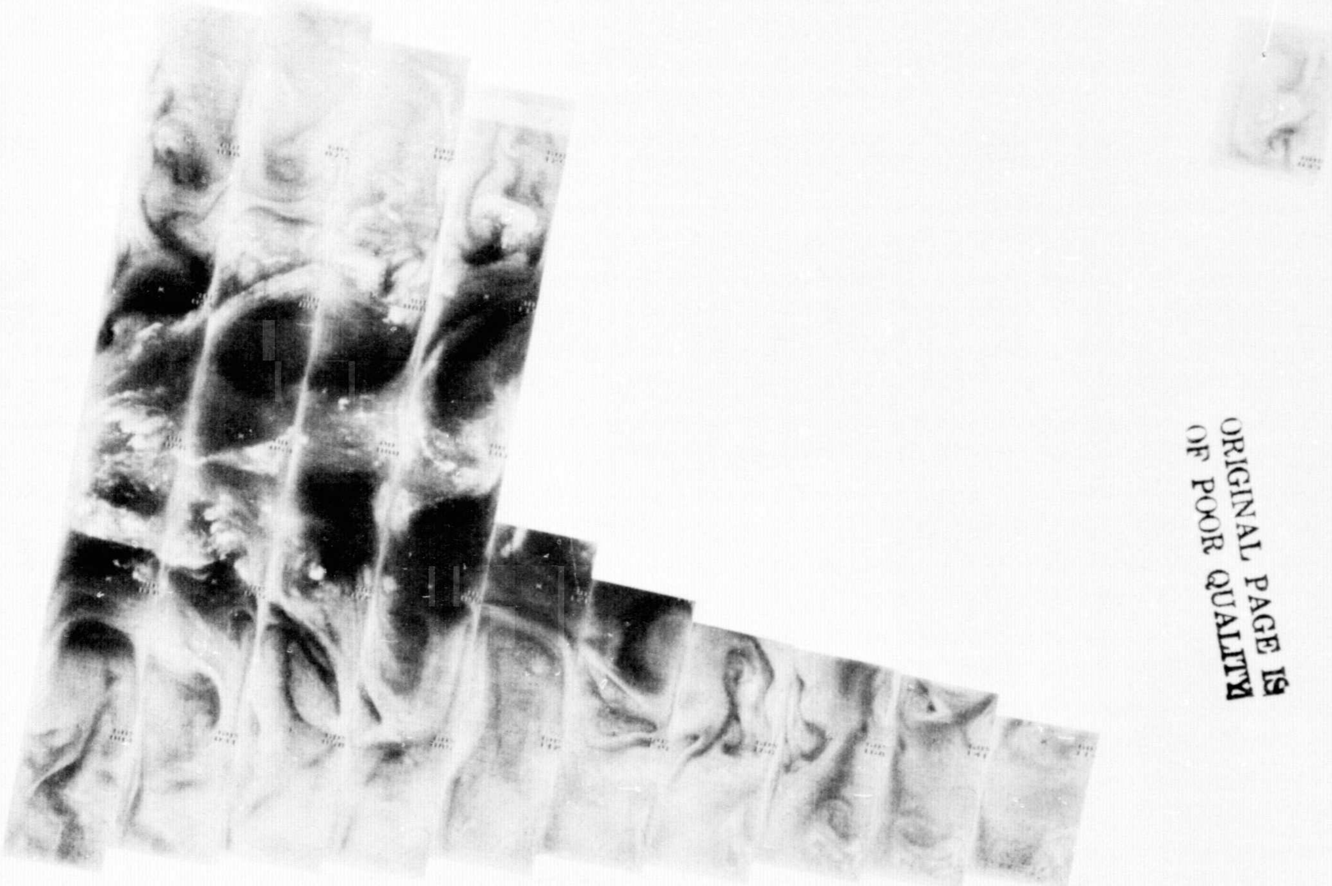
12 MAR 77

6.7 μm

8570 8569 8568 8567 8566 8565 8564 8563 8562 8561 8560 8559 8558 8557

12 MAR 77

11.5 μm



8583 8582 8581 8580 8579 8578 8577 8576 8575 8574 8573 8572 8571

13 MAR 77

6.7 μm

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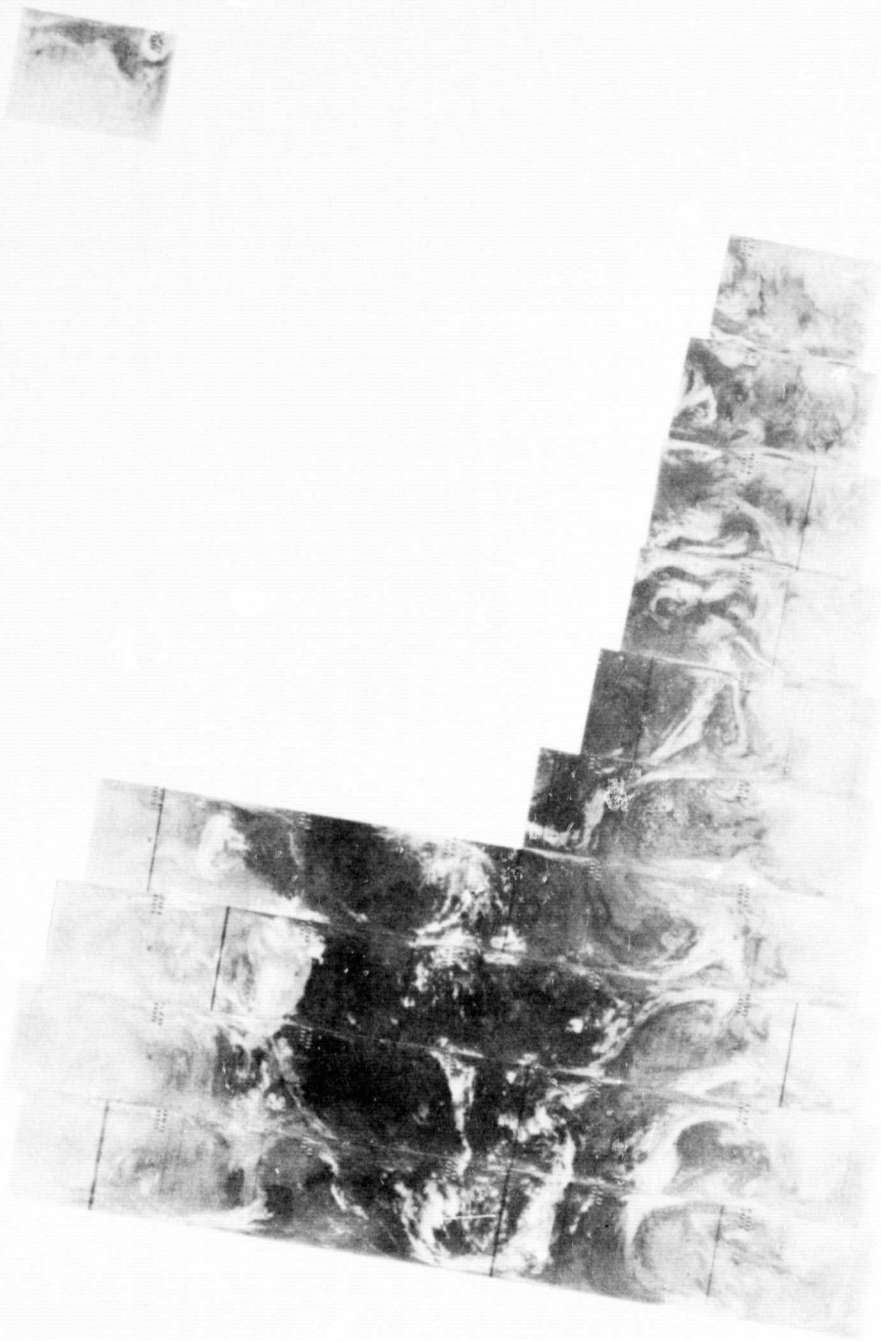
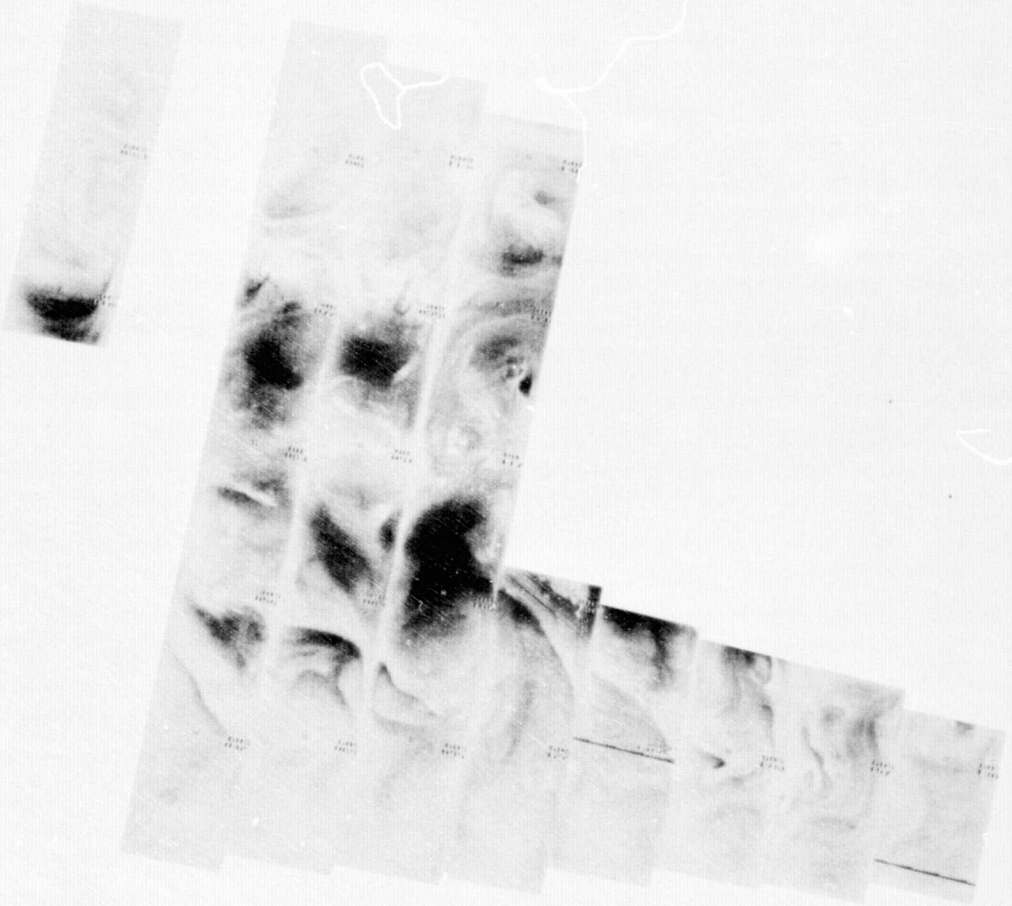
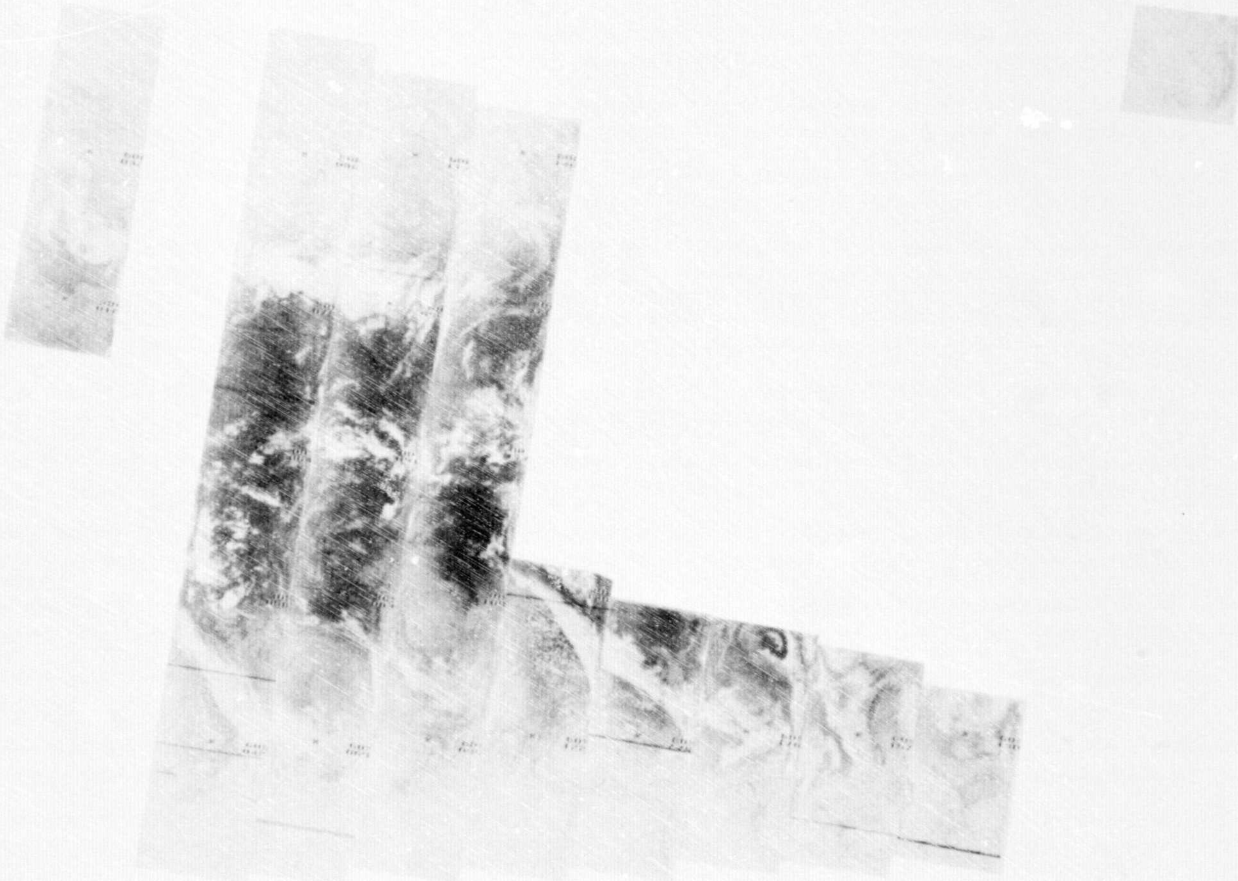




8597 8596 8595 8594 8593 8592 8591 8590 8589 8588 8587 8586 8585 8584

14 MAR 77

6.7 μm



8597 8596 8595 8594 8593 8592 8591 8590 8589 8588 8587 8586 8585 8584

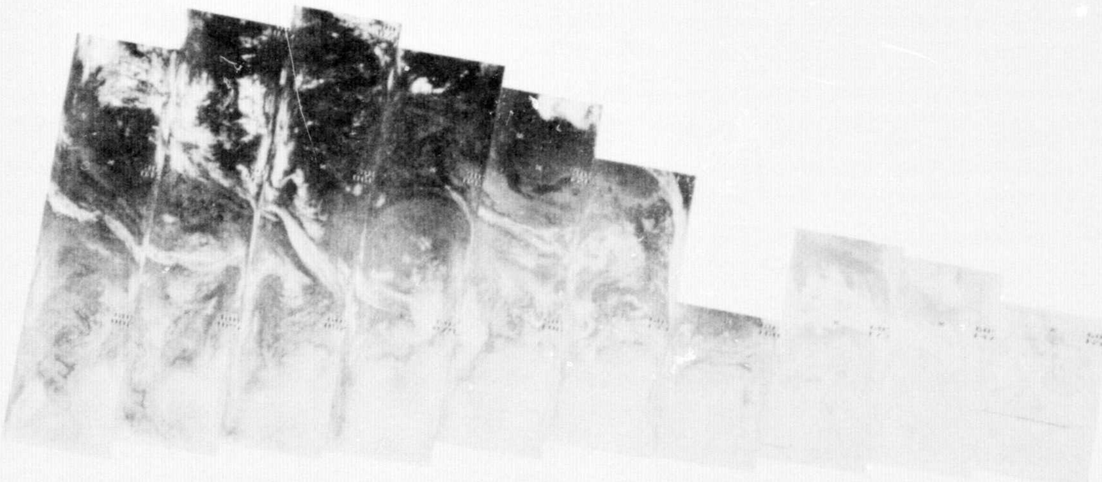
14 MAR 77

11.5 μm

8610 8609 8608 8607 8606 8605 8604 8603 8602 8601 8600 8599 8598

15 MAR 77

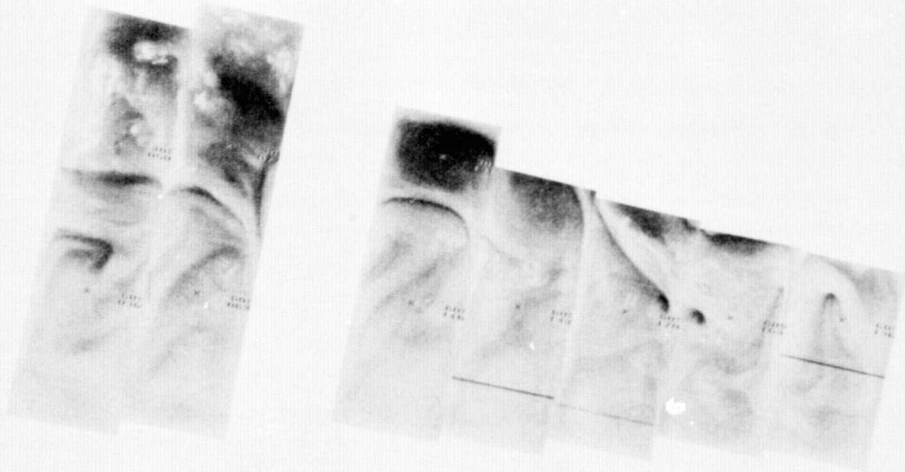
6.7 μm



8610 8609 8608 8607 8606 8605 8604 8603 8602 8601 8600 8599 8598

15 MAR 77

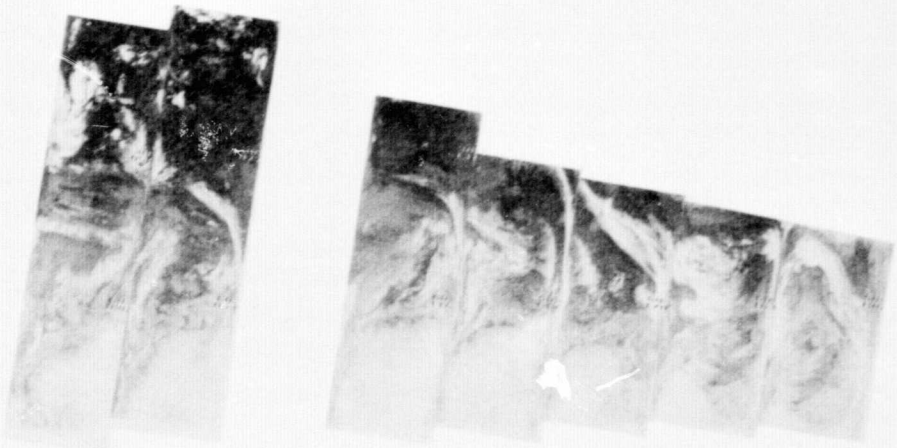
11.5 μm



8623 8622 8621 8620 8619 8618 8617 8616 8615 8614 8613 8612 8611

16 MAR 77

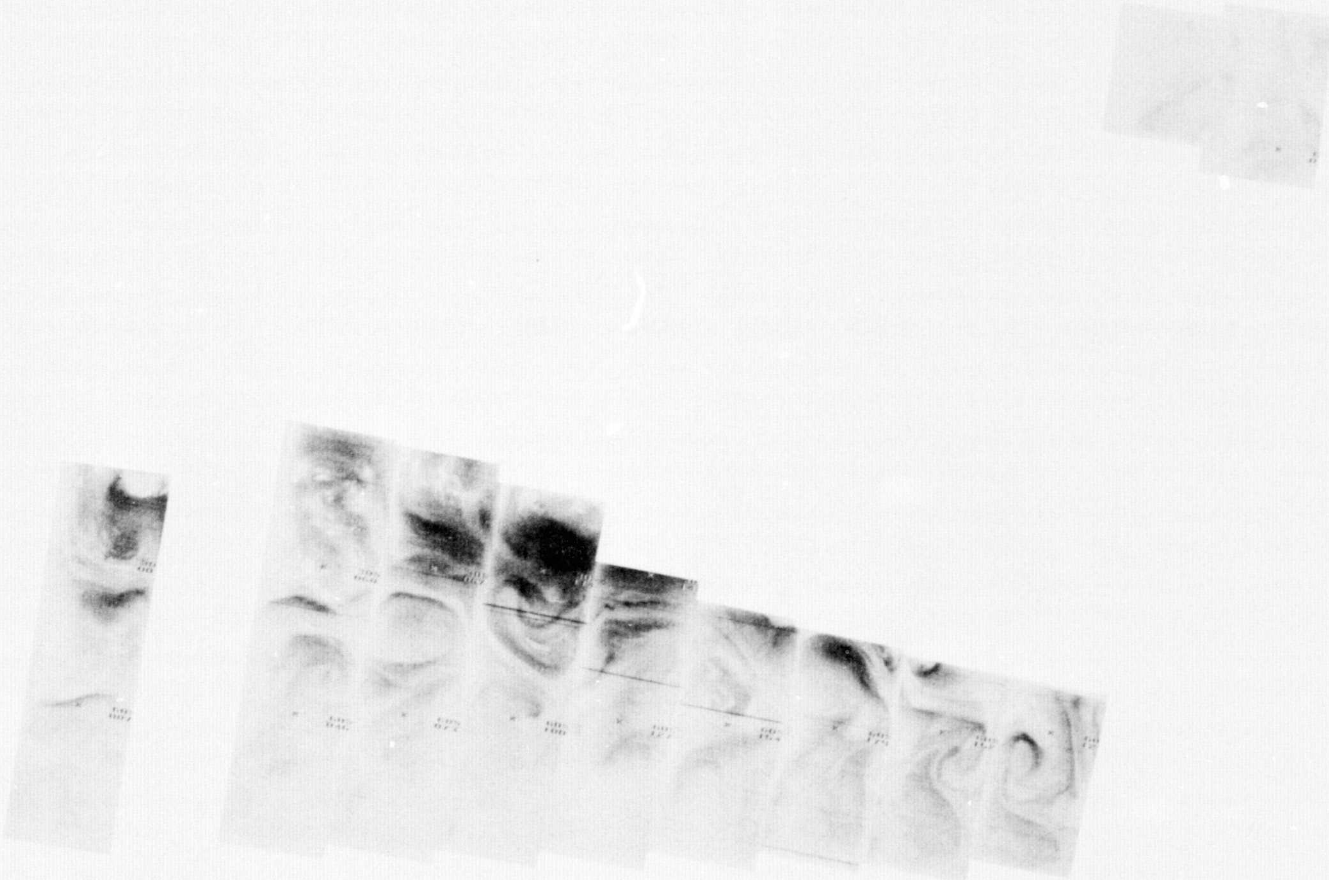
6.7 μm



8623 8622 8621 8620 8619 8618 8617 8616 8615 8614 8613 8612 8611

16 MAR 77

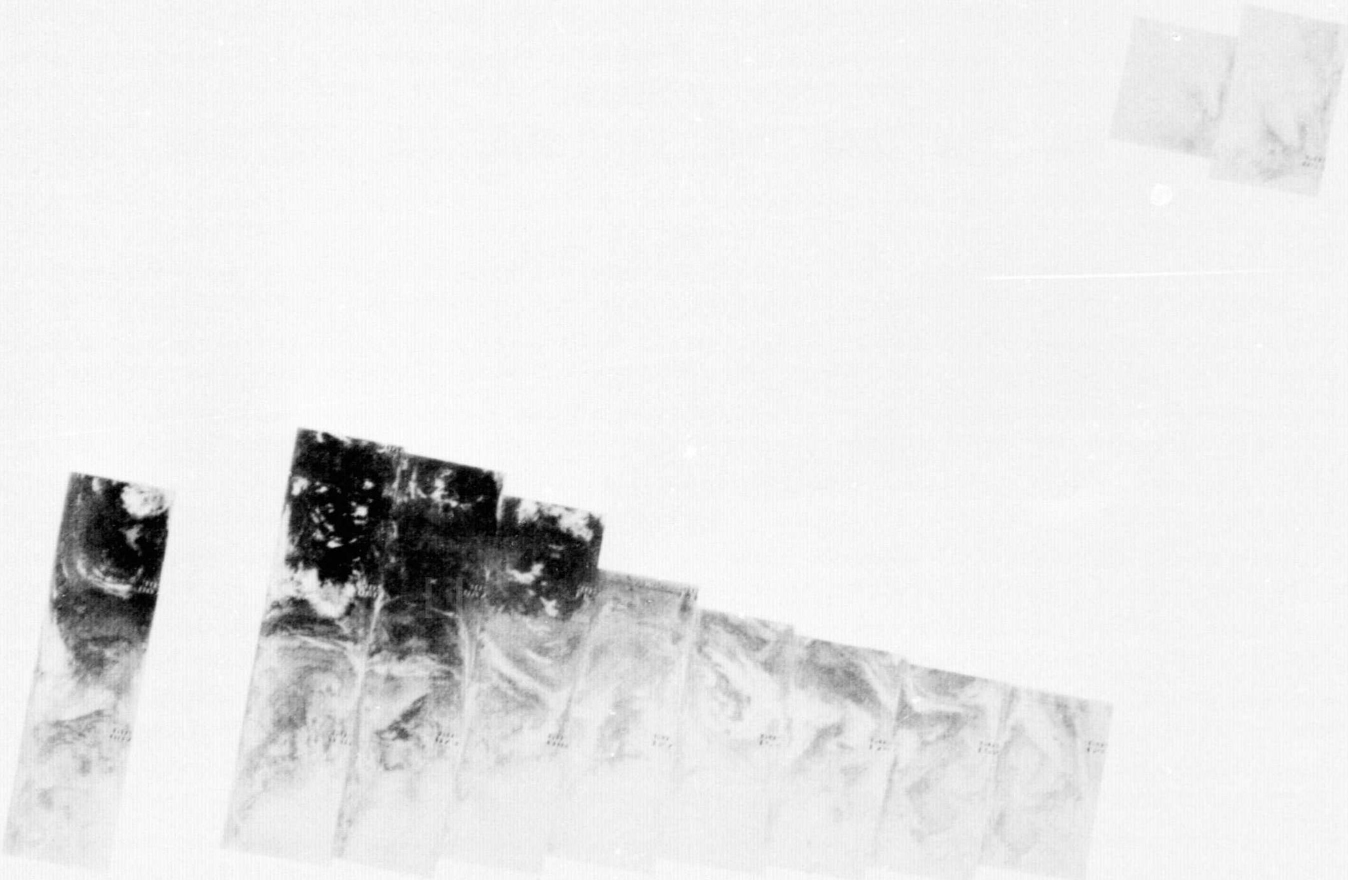
11.5 μm



8637 8636 8635 8634 8633 8632 8631 8630 8629 8628 8627 8626 8625 8624

17 MAR 77

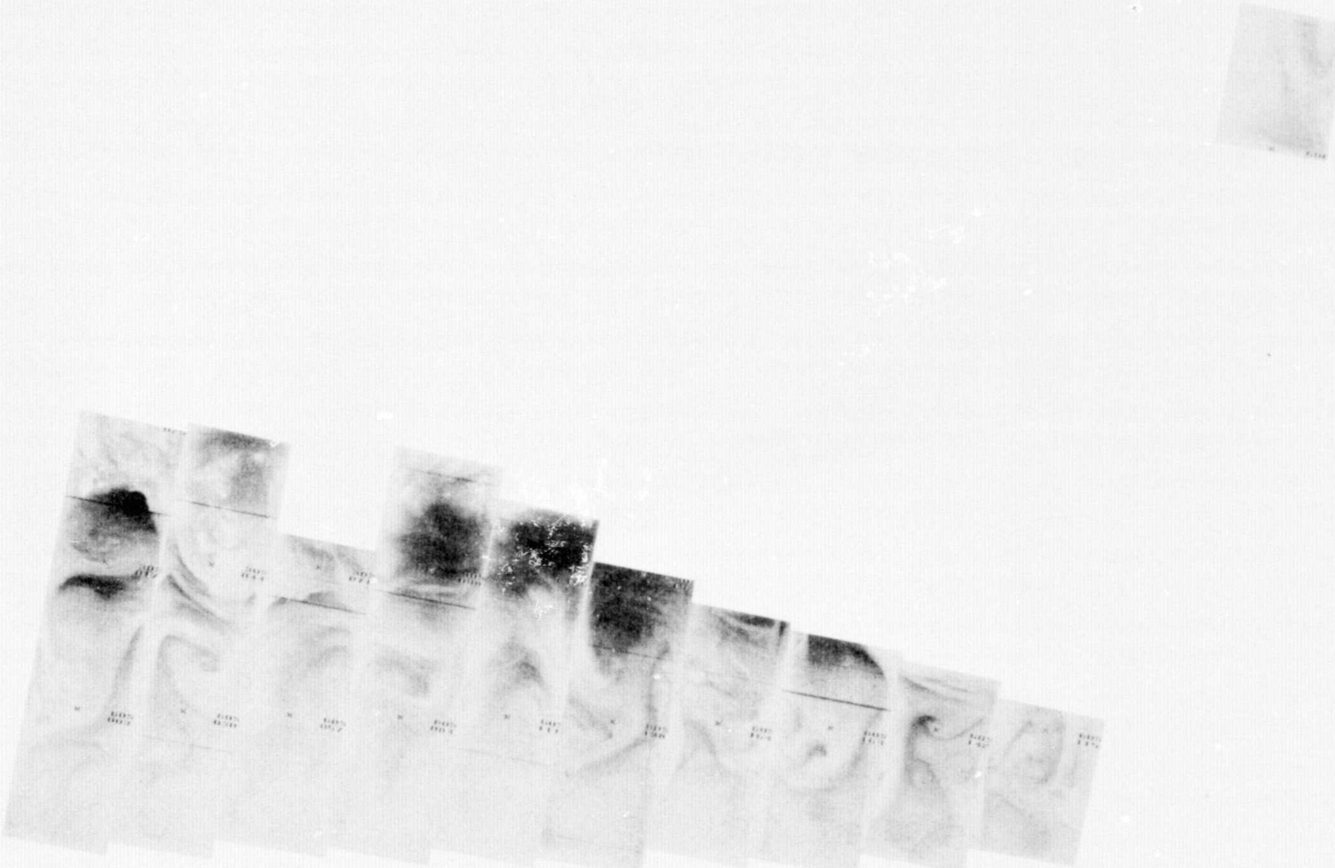
6.7 μm



8637 8636 8635 8634 8633 8632 8631 8630 8629 8628 8627 8626 8625 8624

17 MAR 77

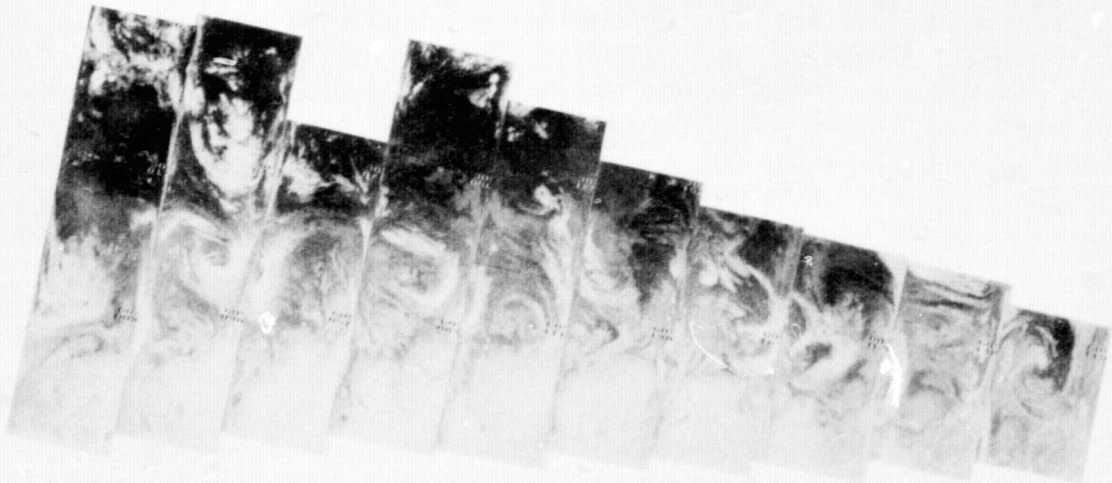
11.5 μm



8650 8649 8648 8647 8646 8645 8644 8643 8642 8641 8640 8639 8638

18 MAR 77

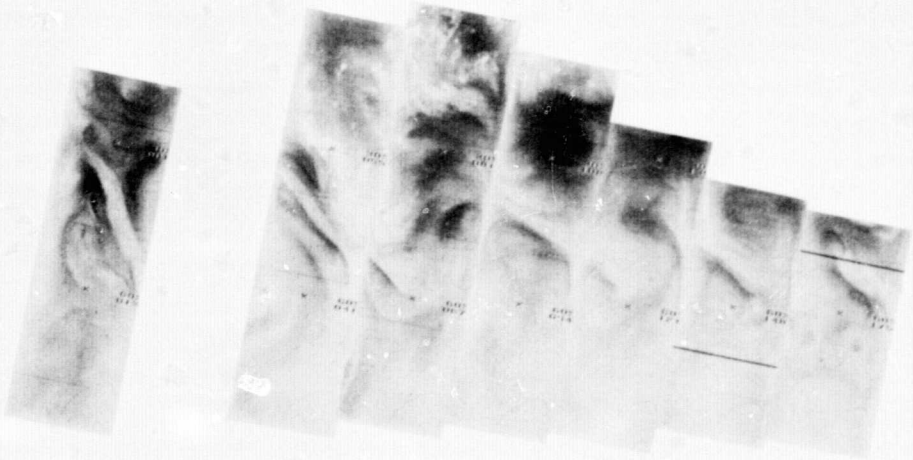
6.7 μm



8650 8649 8648 8647 8646 8645 8644 8643 8642 8641 8640 8639 8638

18 MAR 77

11.5 μm



8664 8663 8662 8661 8660 8659 8658 8657 8656 8655 8654 8653 8652 8651

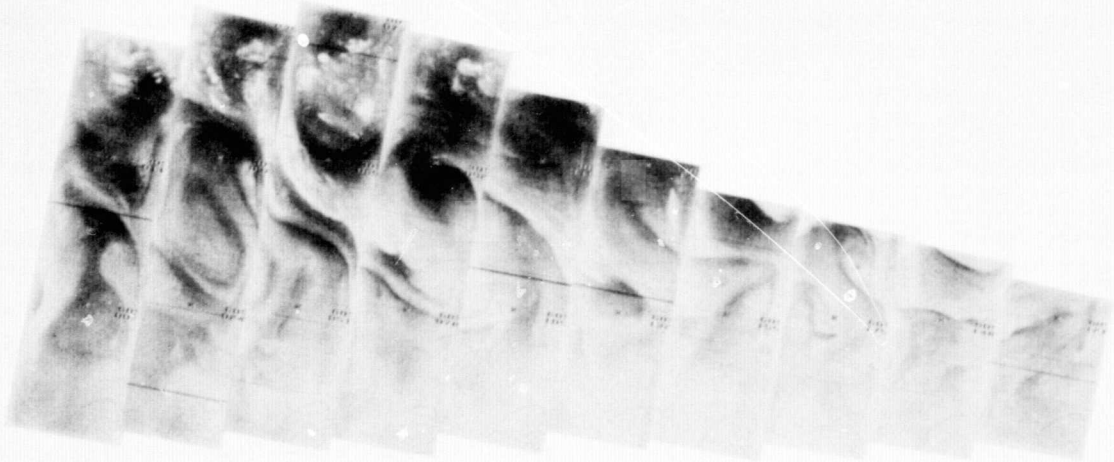
19 MAR 77

6.7 μm

8664 8663 8662 8661 8660 8659 8658 8657 8656 8655 8654 8653 8652 8651

19 MAR 77

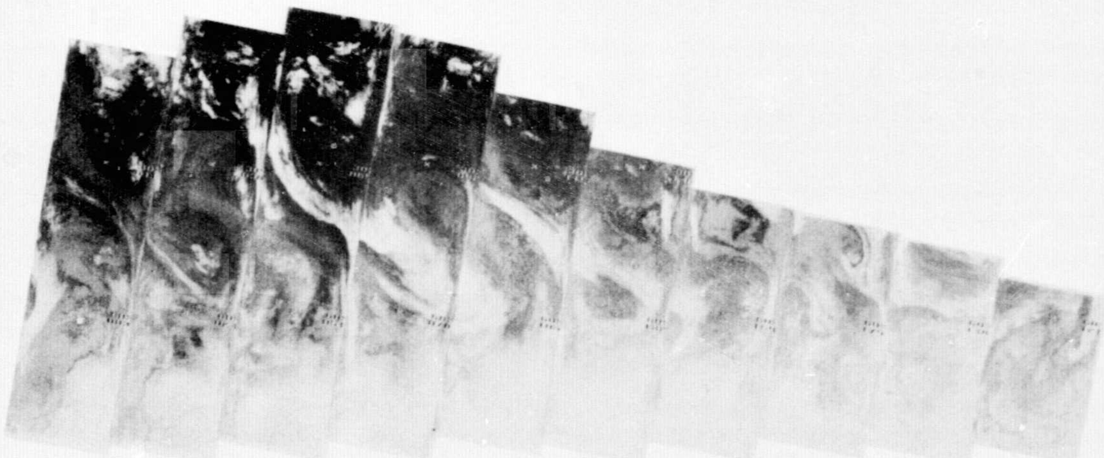
11.5 μm



8677 8676 8675 8674 8673 8672 8671 8670 8669 8668 8667 8666 8665

20 MAR 77

6.7 μm



8677 8676 8675 8674 8673 8672 8671 8670 8669 8668 8667 8666 8665

20 MAR 77

11.5 μm

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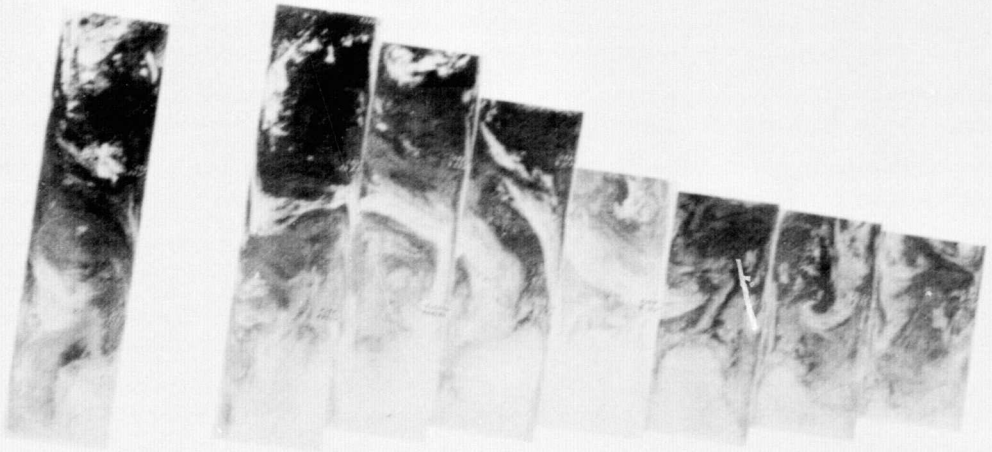
8690 8689 8688 8687 8686 8685 8684 8683 8682 8681 8680 8679 8678

21 MAR 77

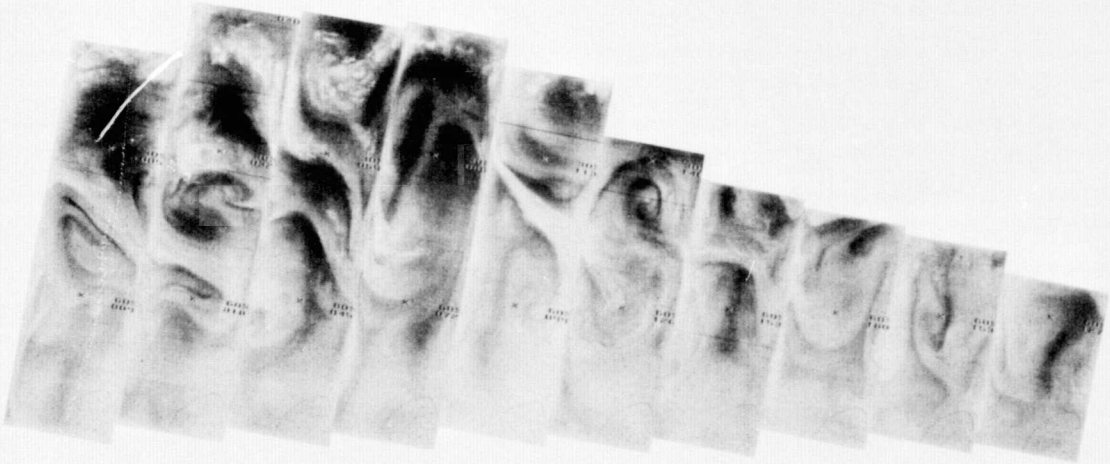
6.7 μm



8690 9689 8688 8687 8686 8685 8684 8683 8682 8681 8680 8679 8678

21 MAR 77

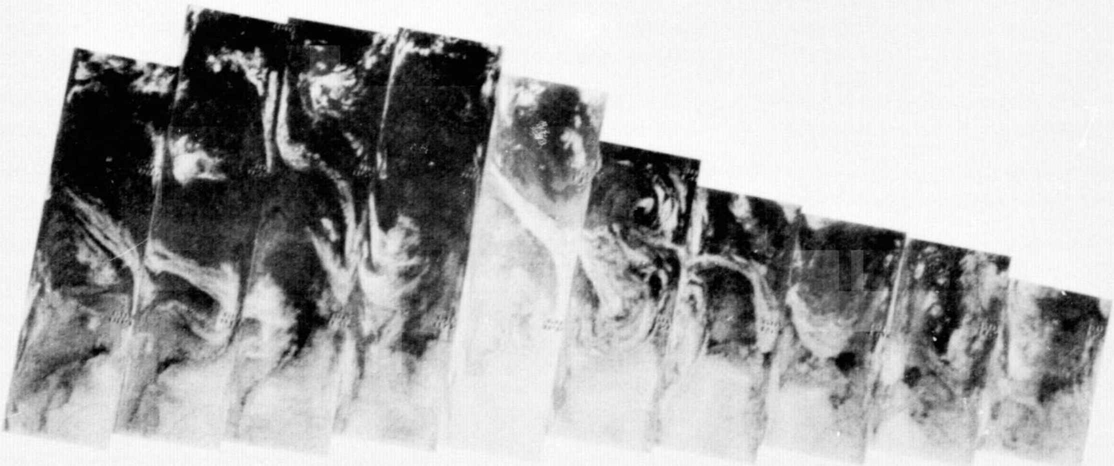
11.5 μm

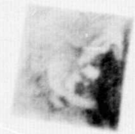


8704 8703 8702 8701 8700 8699 8698 8697 8696 8695 8694 8693 8692 8691

22 MAR 77

6.7 μm





8704 8703 8702 8701 8700 8699 8698 8697 8696 8695 8694 8693 8692 8691

22 MAR 77

11.5 μm

8717 8716 8715 8714 8713 8712 8711 8710 8709 8708 8707 8706 8705

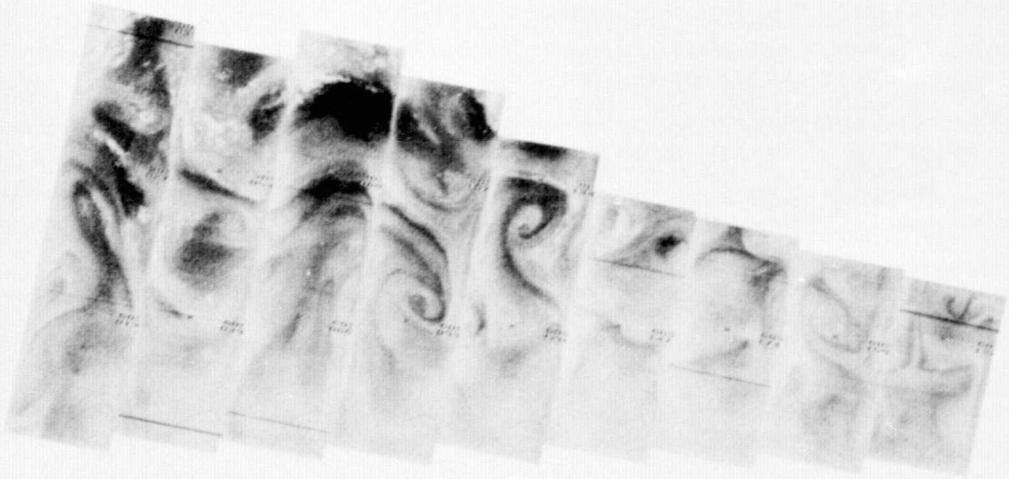
23 MAR 77

6.7 μm

8717 8716 8715 8714 8713 8712 8711 8710 8709 8708 8707 8706 8705

23 MAR 77

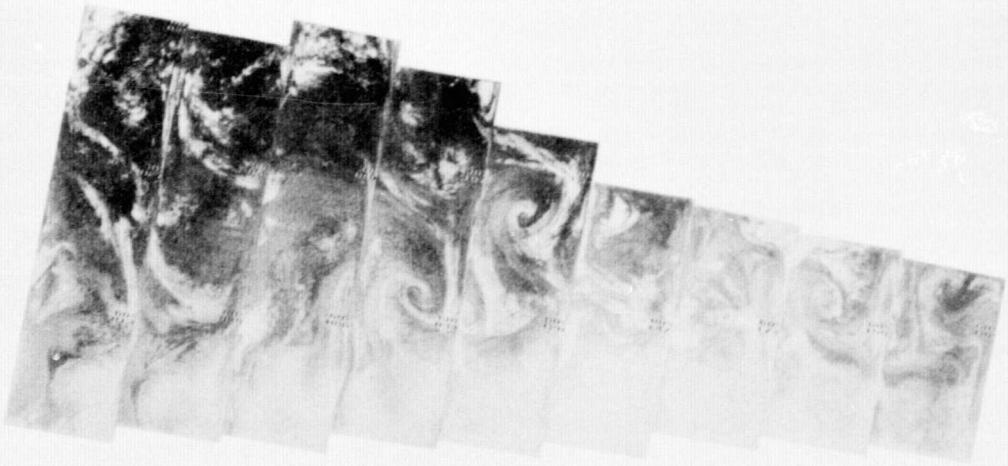
11.5 μm



8730 8729 8728 8727 8726 8725 8724 8723 8722 8721 8720 8719 8718

24 MAR 77

6.7 μm



8730 8729 8728 8727 8726 8725 8724 8723 8722 8721 8720 8719 8718

24 MAR 77

11.5 μm

8744 8743 8742 8741 8740 8739 8738 8737 8736 8735 8734 8733 8732 8731

25 MAR 77

6.7 μm

8744 8743 8742 8741 8740 8739 8738 8737 8736 8735 8734 8733 8732 8731

25 MAR 77

11.5 μm

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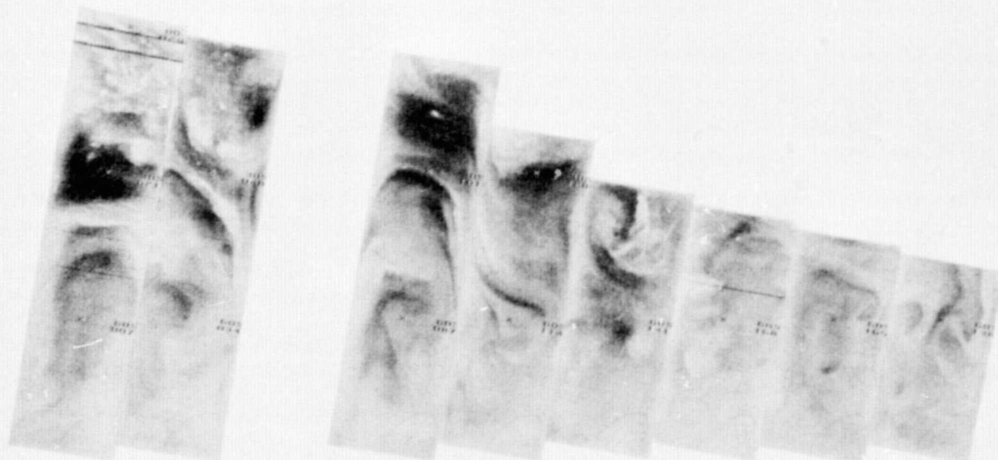
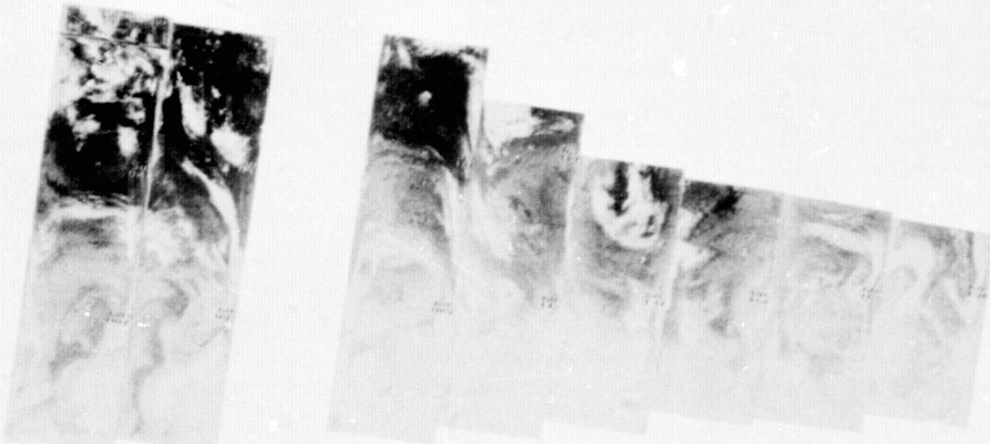
OF POOR QUALITY



8757 8756 8755 8754 8753 8752 8751 8750 8749 8748 8747 8746 8745

26 MAR 77

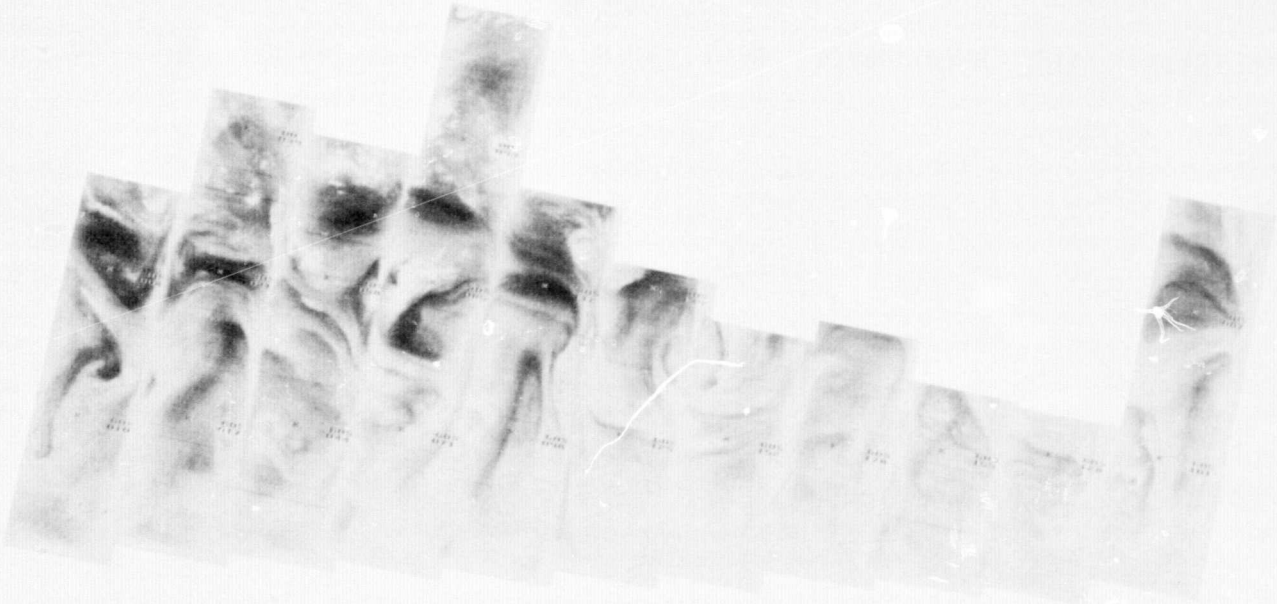
6.7 μm



8757 8756 8755 8754 8753 8752 8751 8750 8749 8748 8747 8746 8745

26 MAR 77

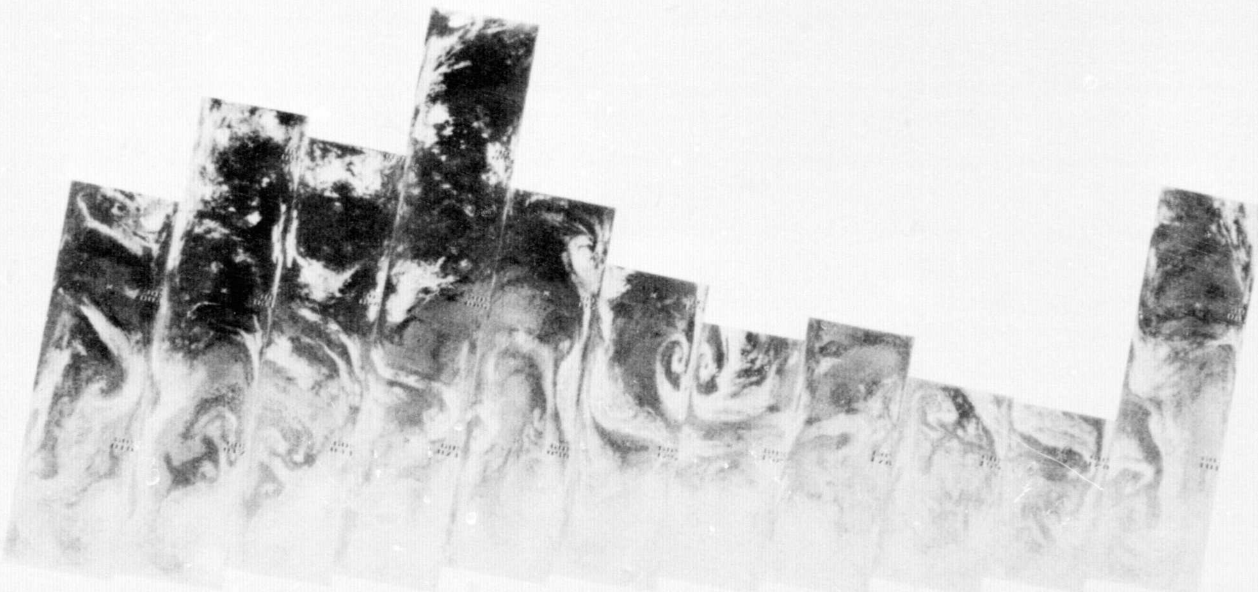
11.5 μm



8771 8770 8769 8768 8767 8766 8765 8764 8763 8762 8761 8760 8759 8758

27 MAR 77

6.7 μm



8771 8770 8769 8768 8767 8766 8765 8764 8763 8762 8761 8760 8759 8758

27 MAR 77

11.5 μm

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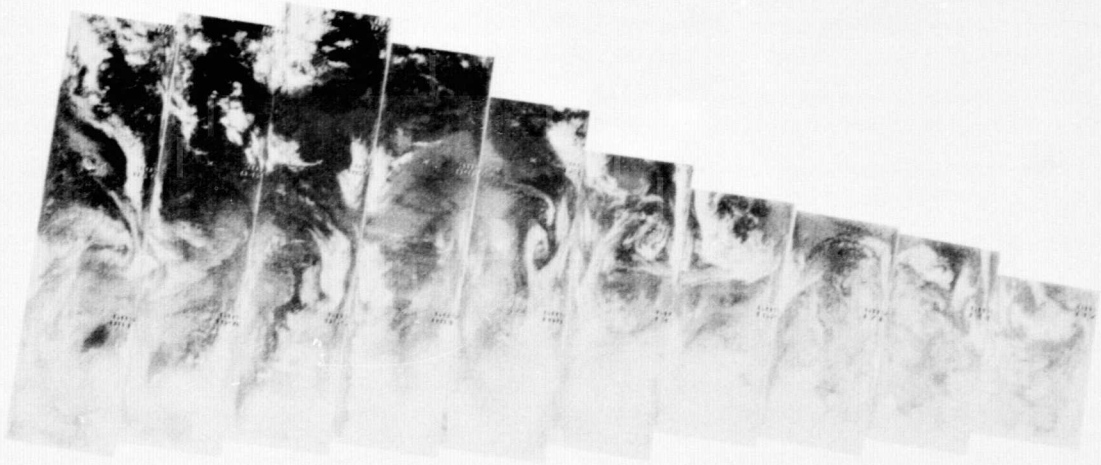
28 MAR 77

6.7 μm



8784 8783 8782 8781 8780 8779 8778 8777 8776 8775 8774 8773 8772

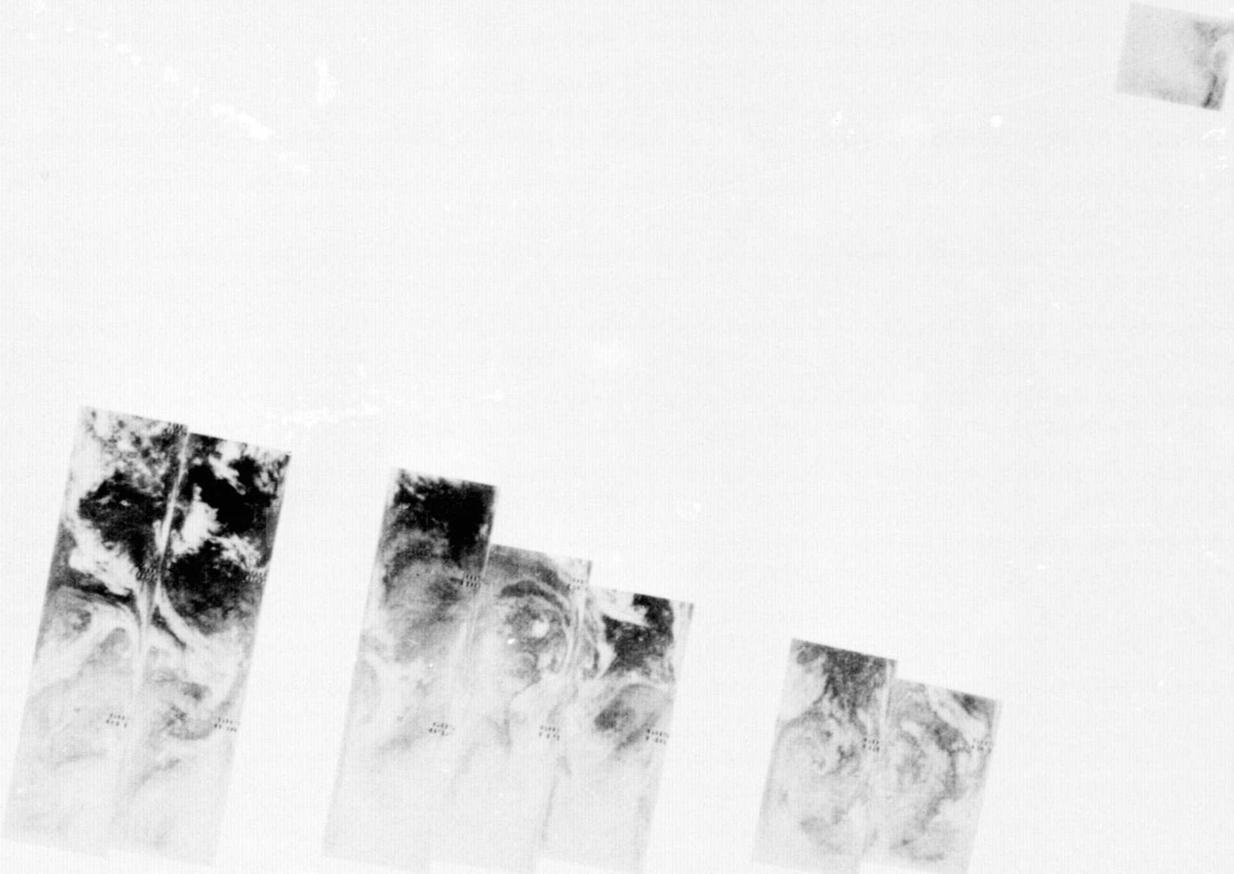
28 MAR 77

11.5 μm

8797 8796 8795 8794 8793 8792 8791 8790 8789 8788 8787 8786 8785

29 MAR 77

6.7 μm



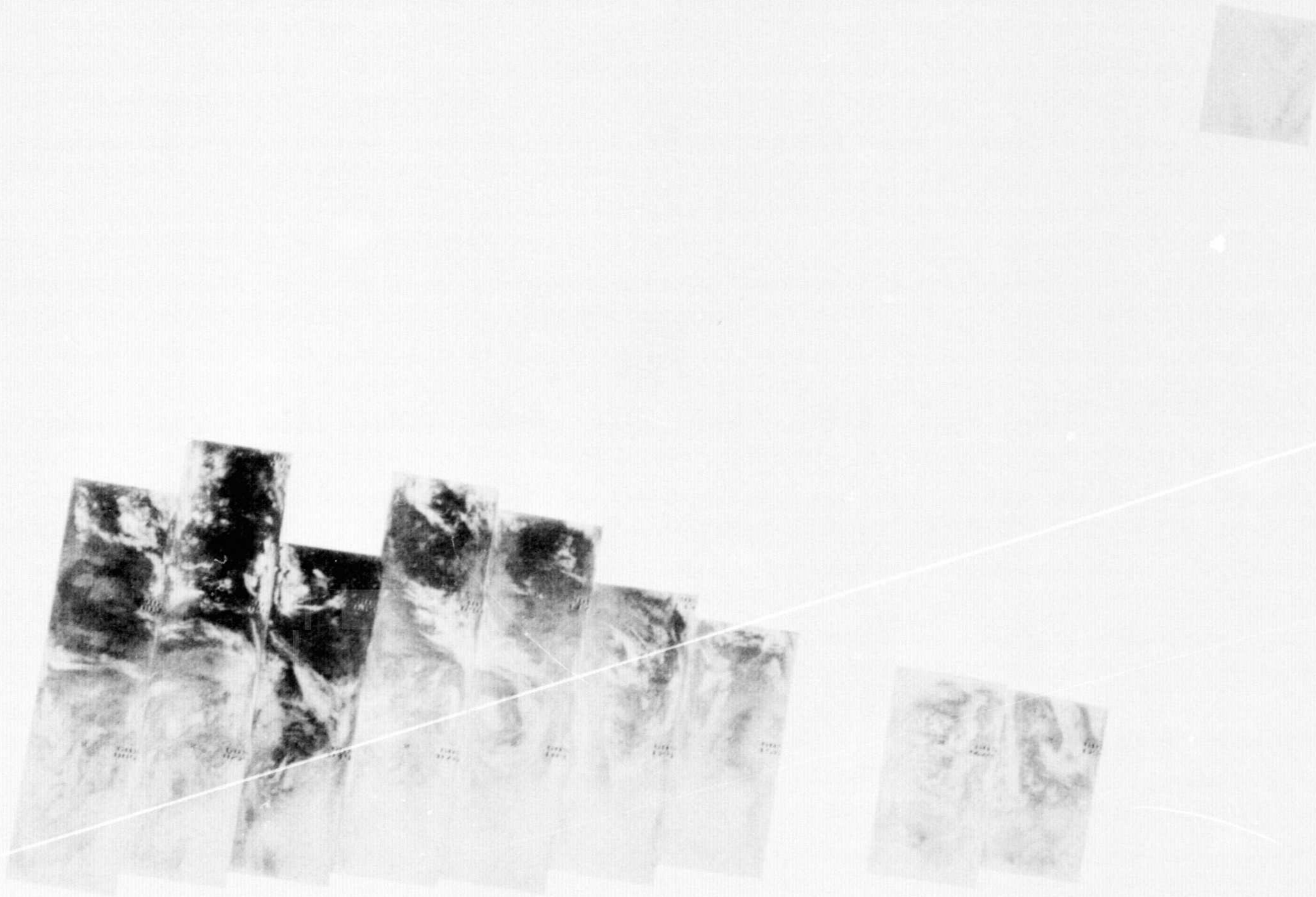
8797 8796 8795 8794 8793 8792 8791 8790 8789 8788 8787 8786 8785

29 MAR 77

11.5 μm

30 MAR 77

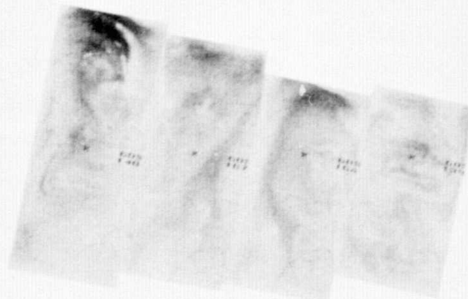
6.7 μm



8811 8810 8809 8808 8807 8806 8805 8804 8803 8802 8801 8800 8799 8798

30 MAR 77

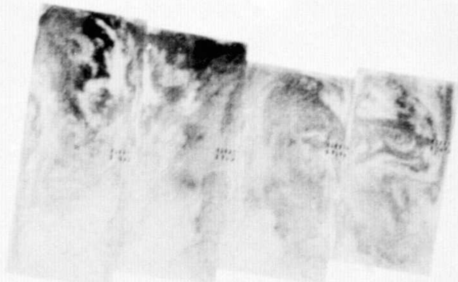
11.5 μm



8824 8823 8822 8821 8820 8819 8818 8817 8816 8815 8814 8813 8812

31 MAR 77

6.7 μm



8824 8823 8822 8821 8820 8819 8818 8817 8816 8815 8814 8813 8812

31 MAR 77

11.5 μm

9092 9091 9090 9089 9088 9087 9086 9085 9084 9083 9082 9081 9080

20 APR 77

6.7 μm

9092 9091 9090 9089 9088 9087 9086 9085 9084 9083 9082 9081 9080

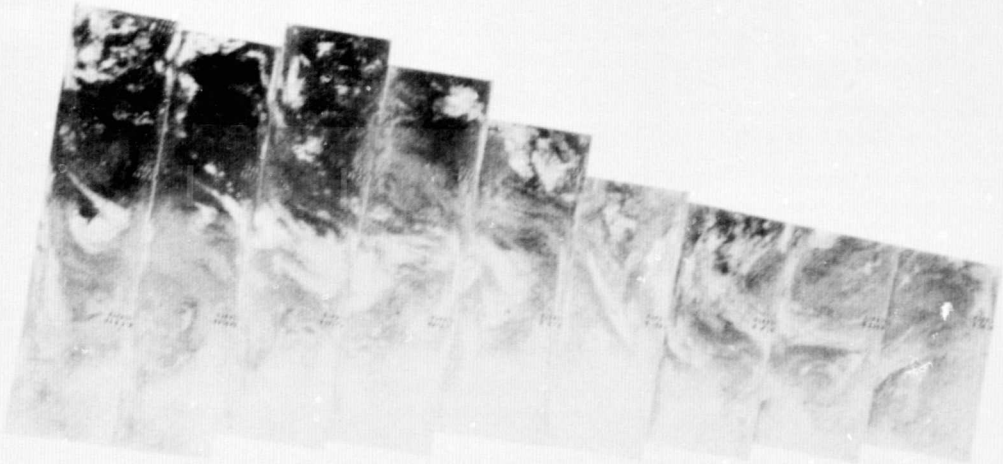
20 APR 77

11.5 μm

9105 9104 9103 9102 9101 9100 9099 9098 9097 9096 9095 9094 9093

21 APR 77

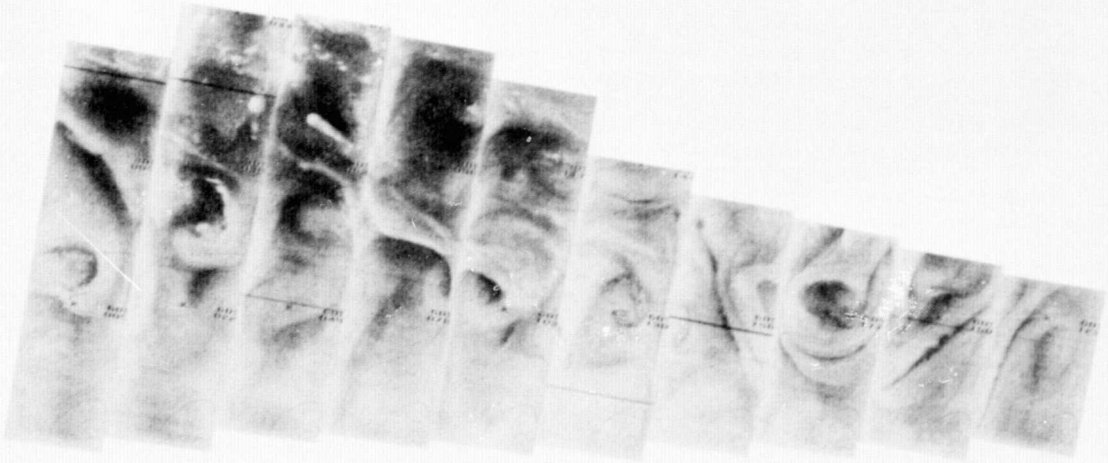
6.7 μm



9105 9104 9103 9102 9101 9100 9099 9098 9097 9096 9095 9094 9093

21 APR 77

11.5 μm



9119 9118 9117 9116 9115 9114 9113 9112 9111 9110 9109 9108 9107 9106

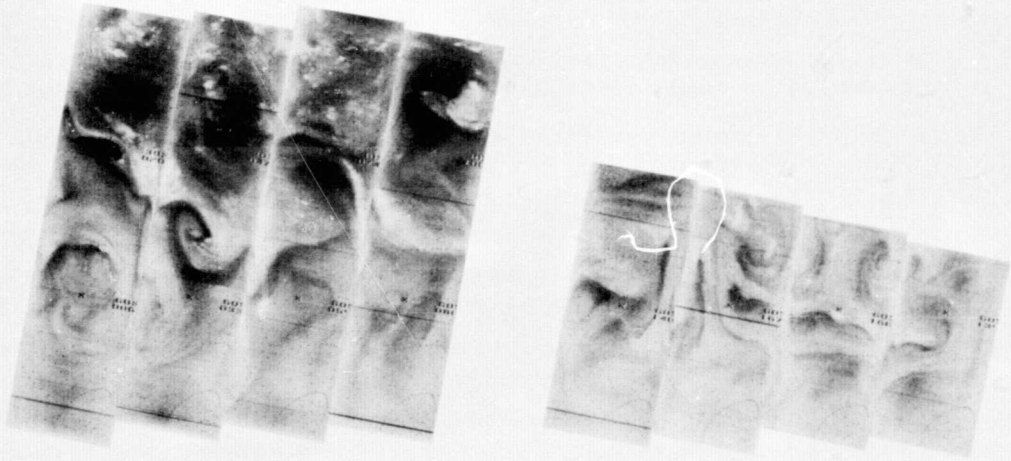
22 APR 77

6.7 μm

9119 9118 9117 9116 9115 9114 9113 9112 9111 9110 9109 9108 9107 9106

22 APR 77

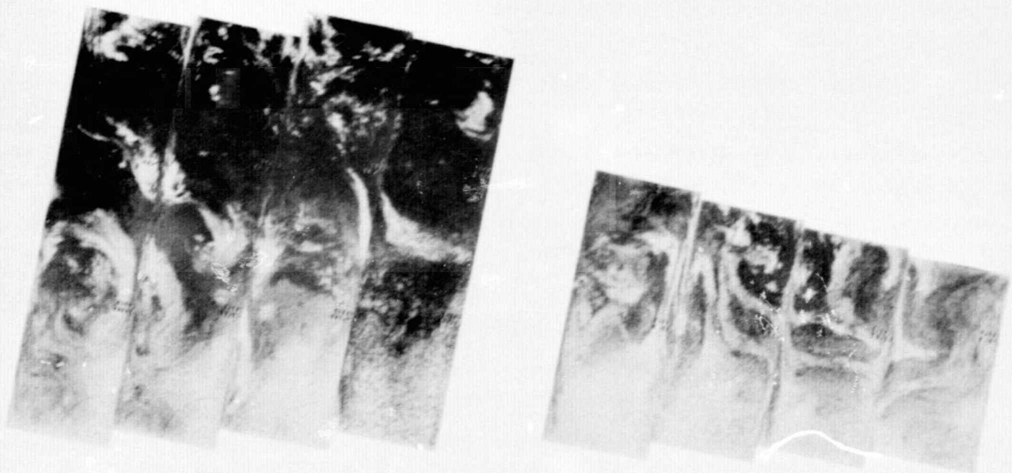
11.5 μm



9132 9131 9130 9129 9128 9127 9126 9125 9124 9123 9122 9121 9120

23 APR 77

6.7 μm



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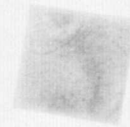
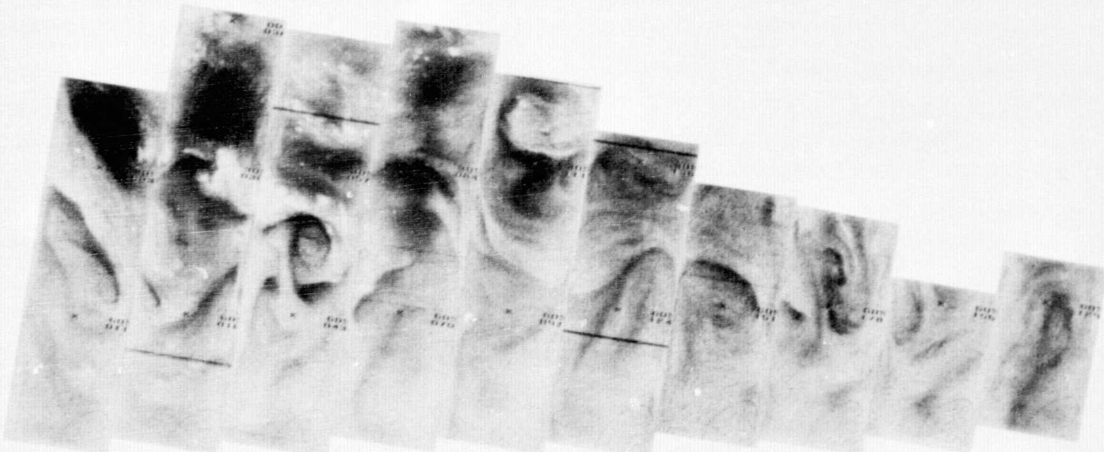
23 APR 77

11.5 μm

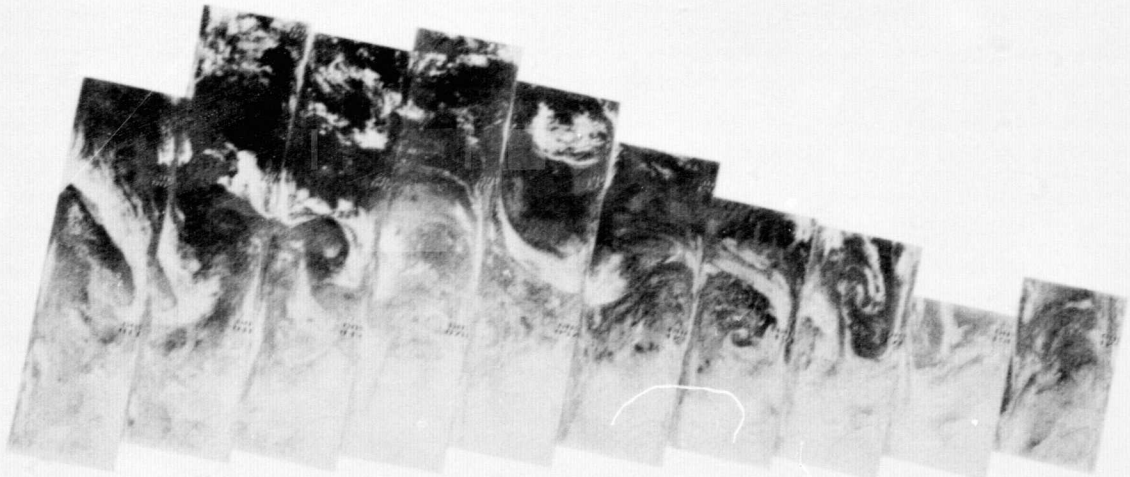




9146 9145 9144 9143 9142 9141 9140 9139 9138 9137 9136 9135 9134 9133

24 APR 77

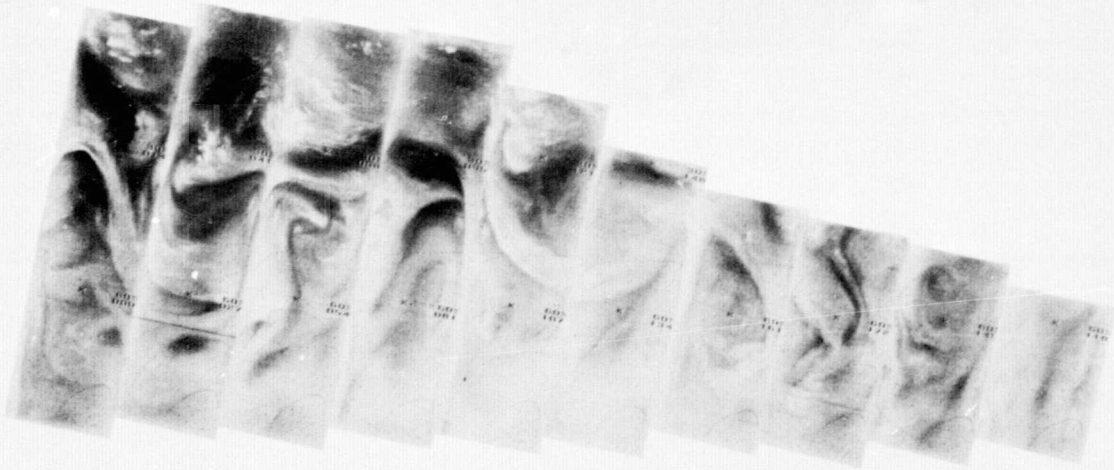
6.7 μm



9146 9145 9144 9143 9142 9141 9140 9139 9138 9137 9136 9135 9134 9133

24 APR 77

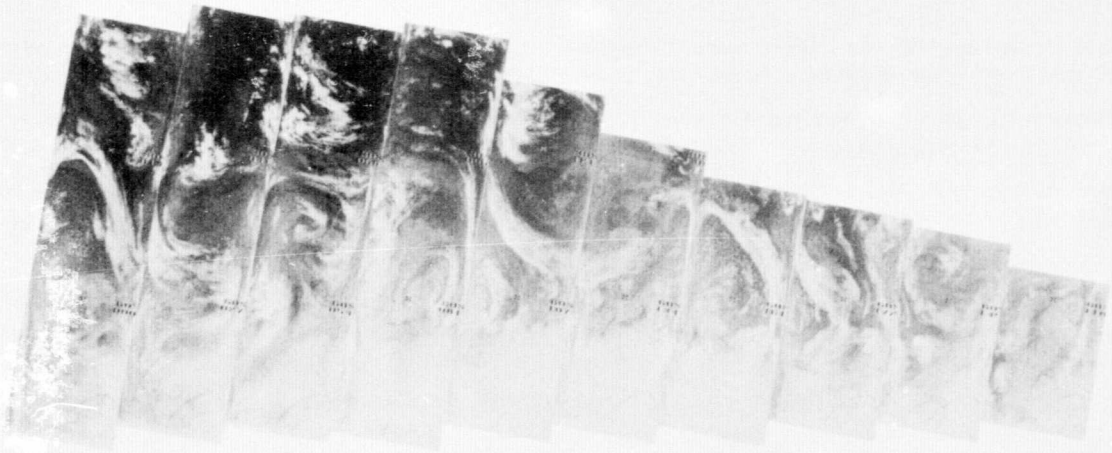
11.5 μm



9159 9158 9157 9156 9155 9154 9153 9152 9151 9150 9149 9148 9147

25 APR 77

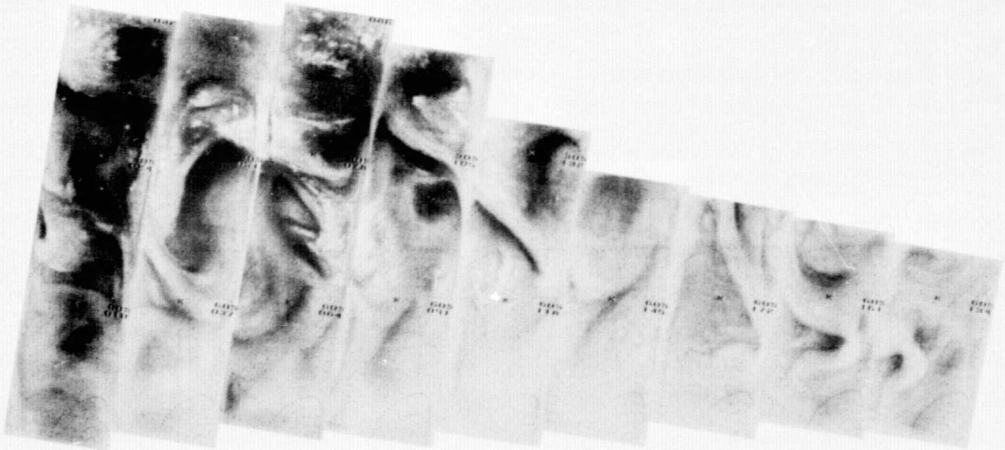
6.7 μm



9159 9158 9157 9156 9155 9154 9153 9152 9151 9150 9149 9148 9147

25 APR 77

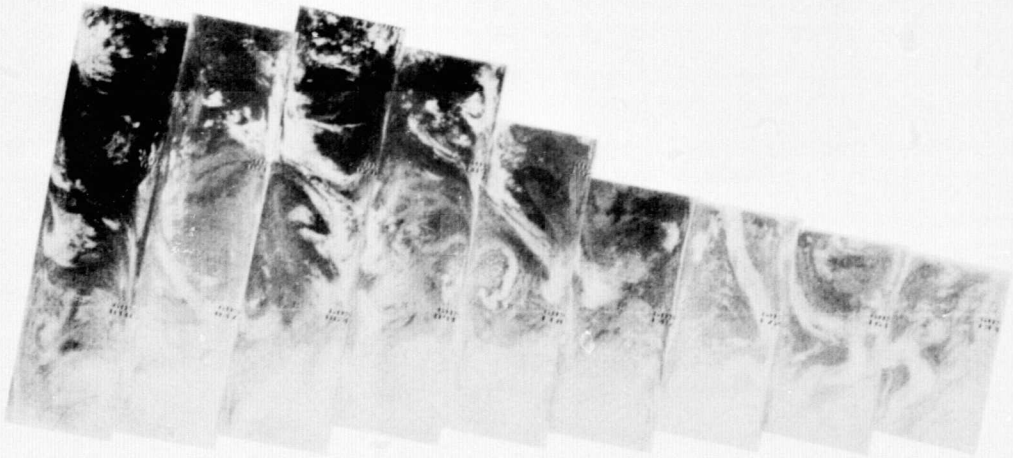
11.5 μm



9172 9171 9170 9169 9168 9167 9166 9165 9164 9163 9162 9161 9160

26 APR 77

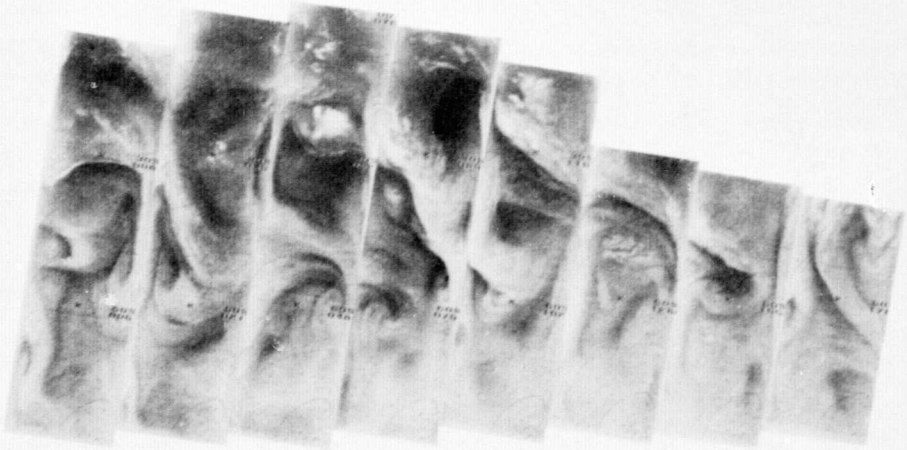
6.7 μm



9172 9171 9170 9169 9168 9167 9166 9165 9164 9163 9162 9161 9160

26 APR 77

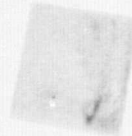
11.5 μm

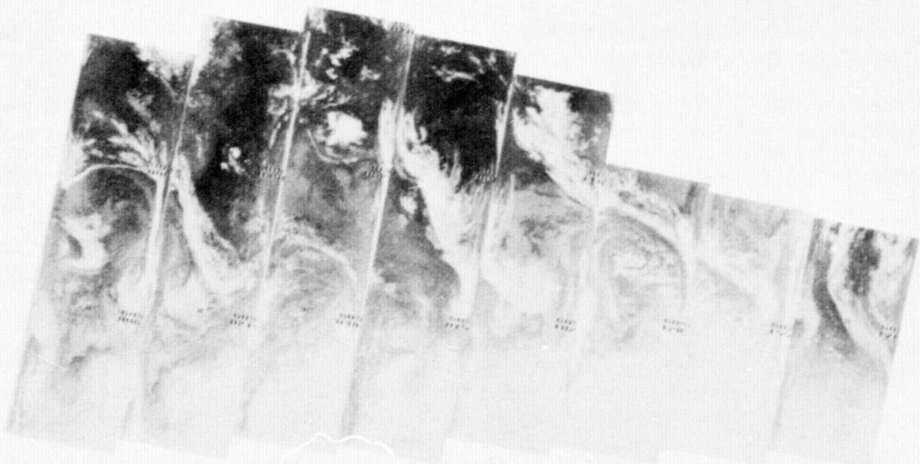


9186 9185 9184 9183 9182 9181 9180 9179 9178 9177 9176 9175 9174 9173

27 APR 77

6.7 μm

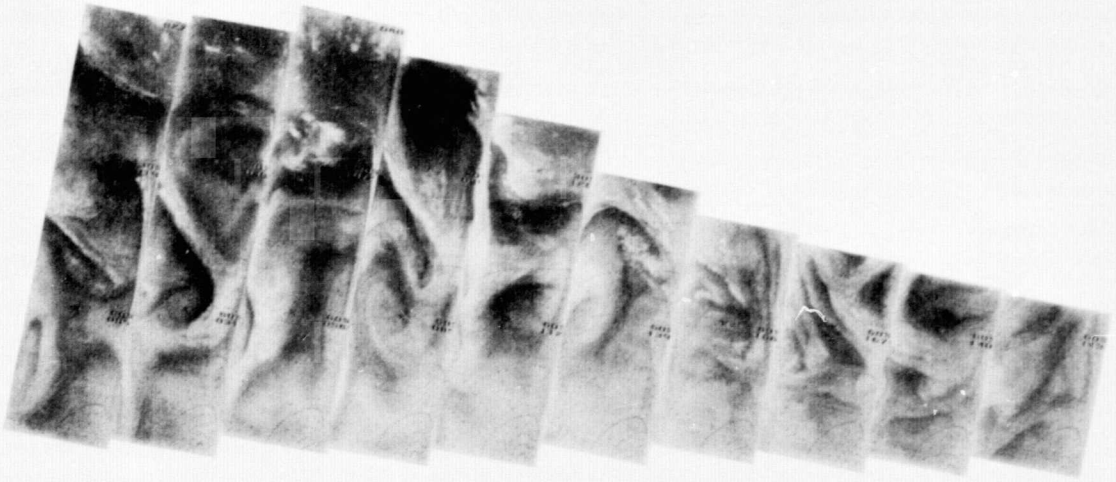




9186 9185 9184 9183 9182 9181 9180 9179 9178 9177 9176 9175 9174 9173

27 APR 77

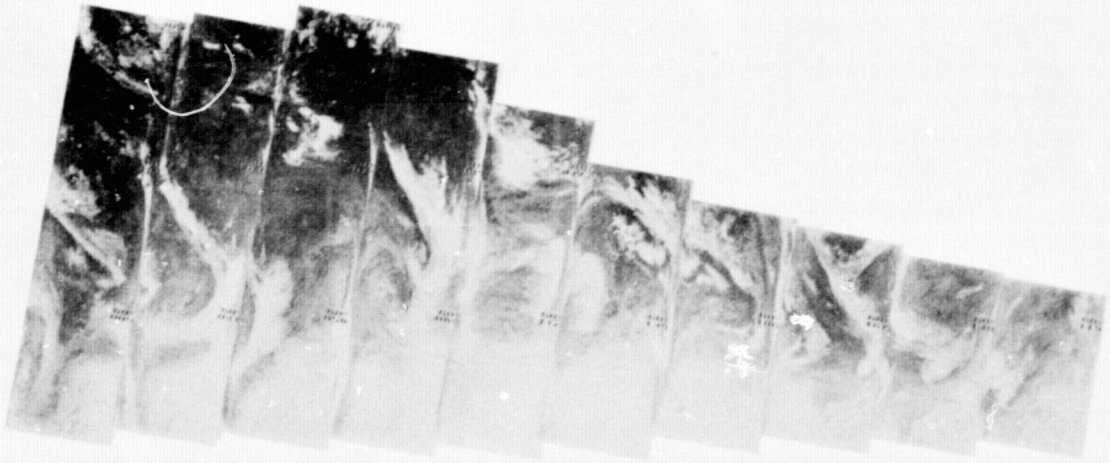
11.5 μm



9199 9198 9197 9196 9195 9194 9193 9192 9191 9190 9189 9188 9187

28 APR 77

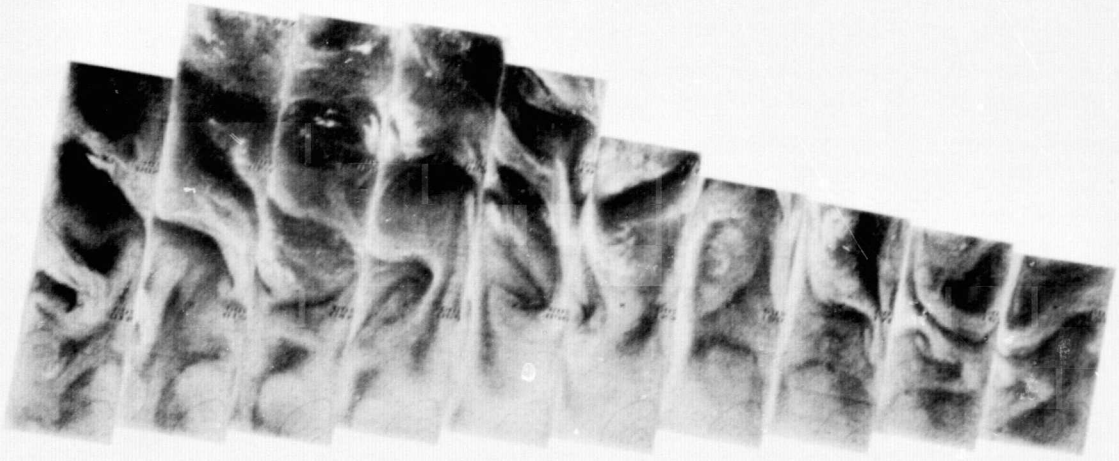
6.7 μm



9199 9198 9197 9196 9195 9194 9193 9192 9191 9190 9189 9188 9187

28 APR 77

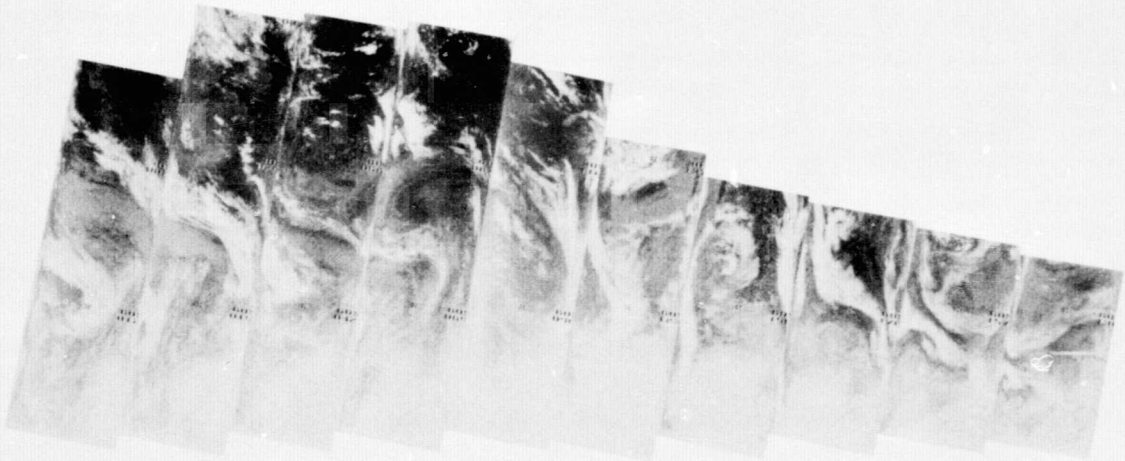
11.5 μm



9213 9212 9211 9210 9209 9208 9207 9206 9205 9204 9203 9202 9201 9200

29 APR 77

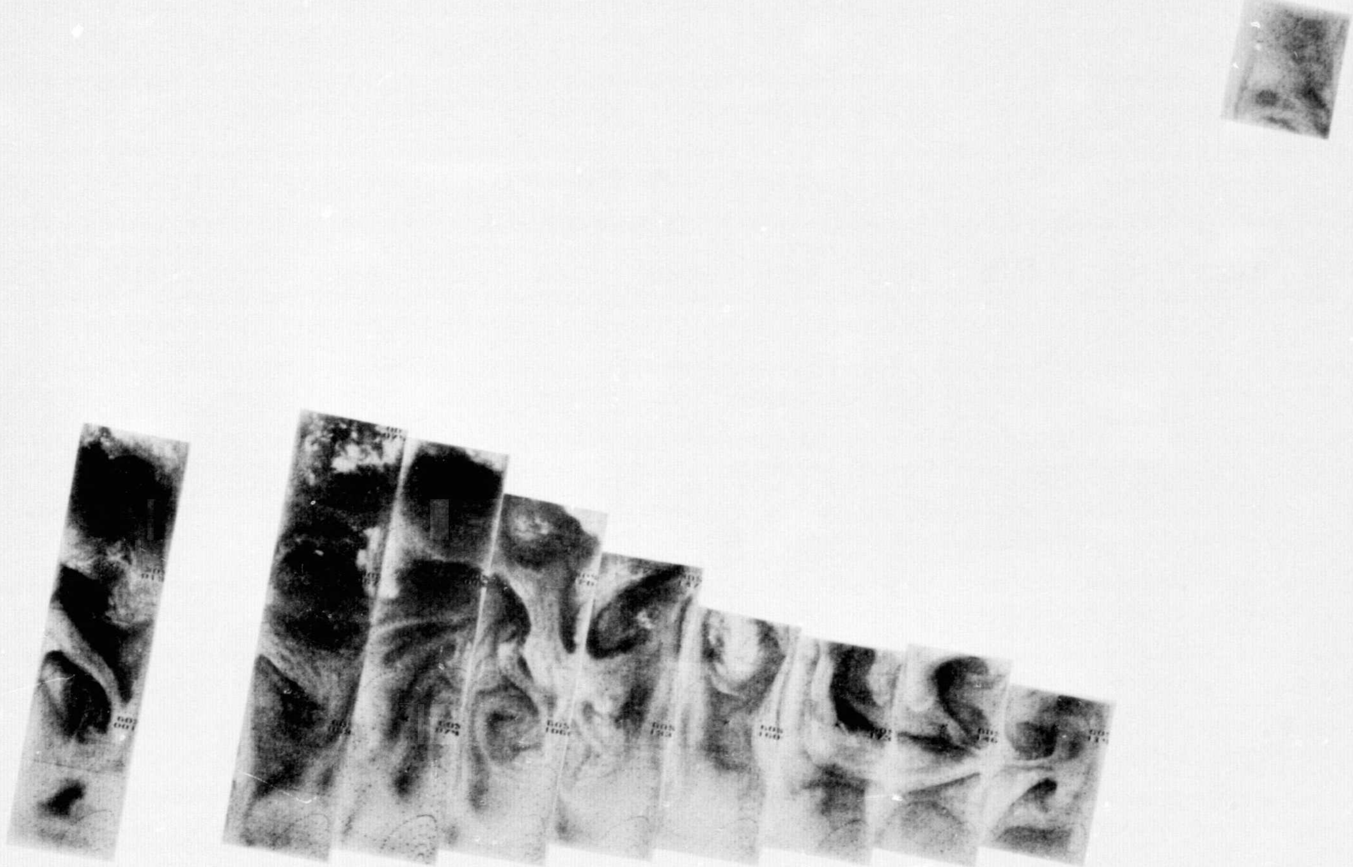
6.7 μm



9213 9212 9211 9210 9209 9208 9207 9206 9205 9204 9203 9202 9201 9200

29 APR 77

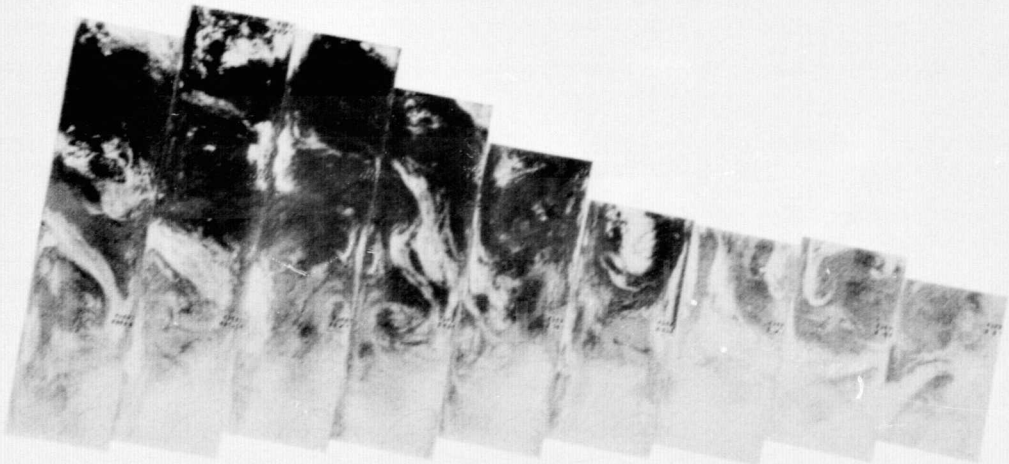
11.5 μm



9226 9225 9224 9223 9222 9221 9220 9219 9218 9217 9216 9215 9214

30 APR 77

6.7 μm



9226 9225 9224 9223 9222 9221 9220 9219 9218 9217 9216 9215 9214

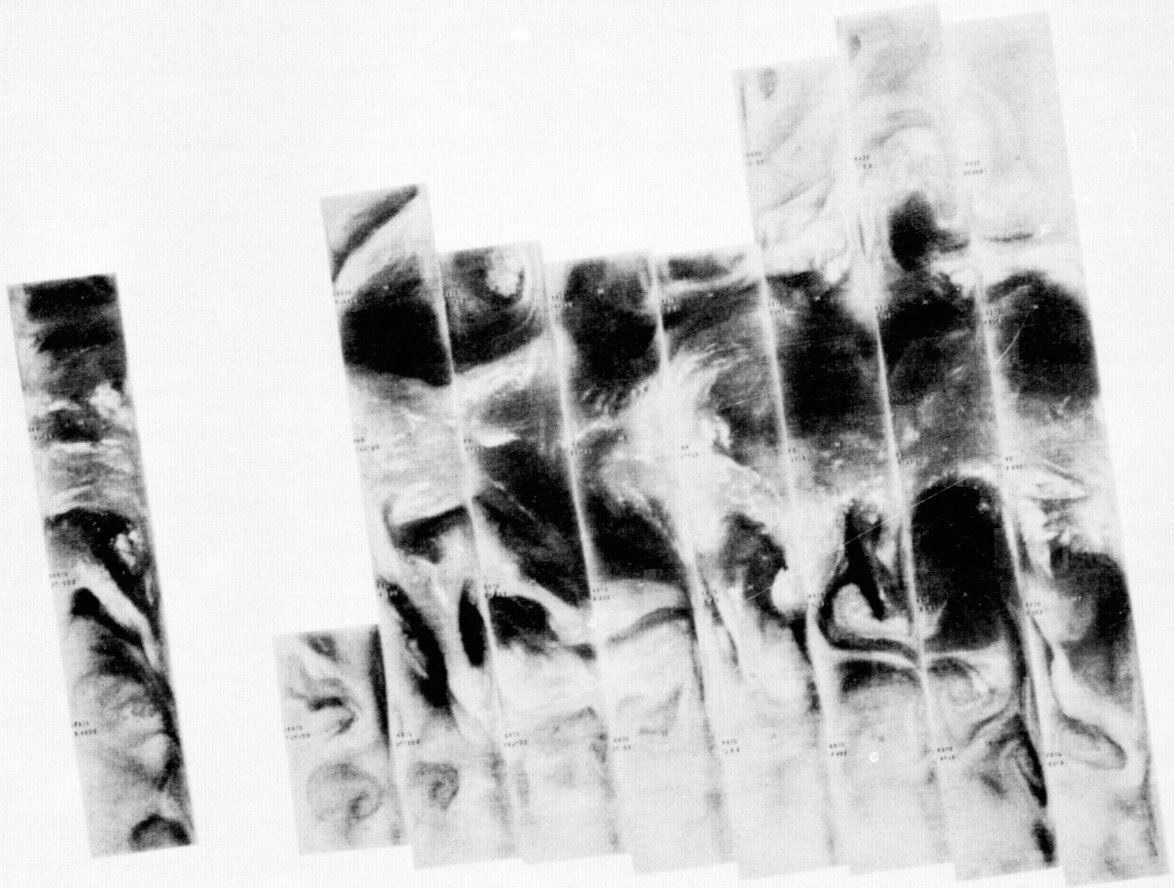
30 APR 77

11.5 μm

SECTION 4.2

TEMPERATURE HUMIDITY INFRARED RADIOMETER

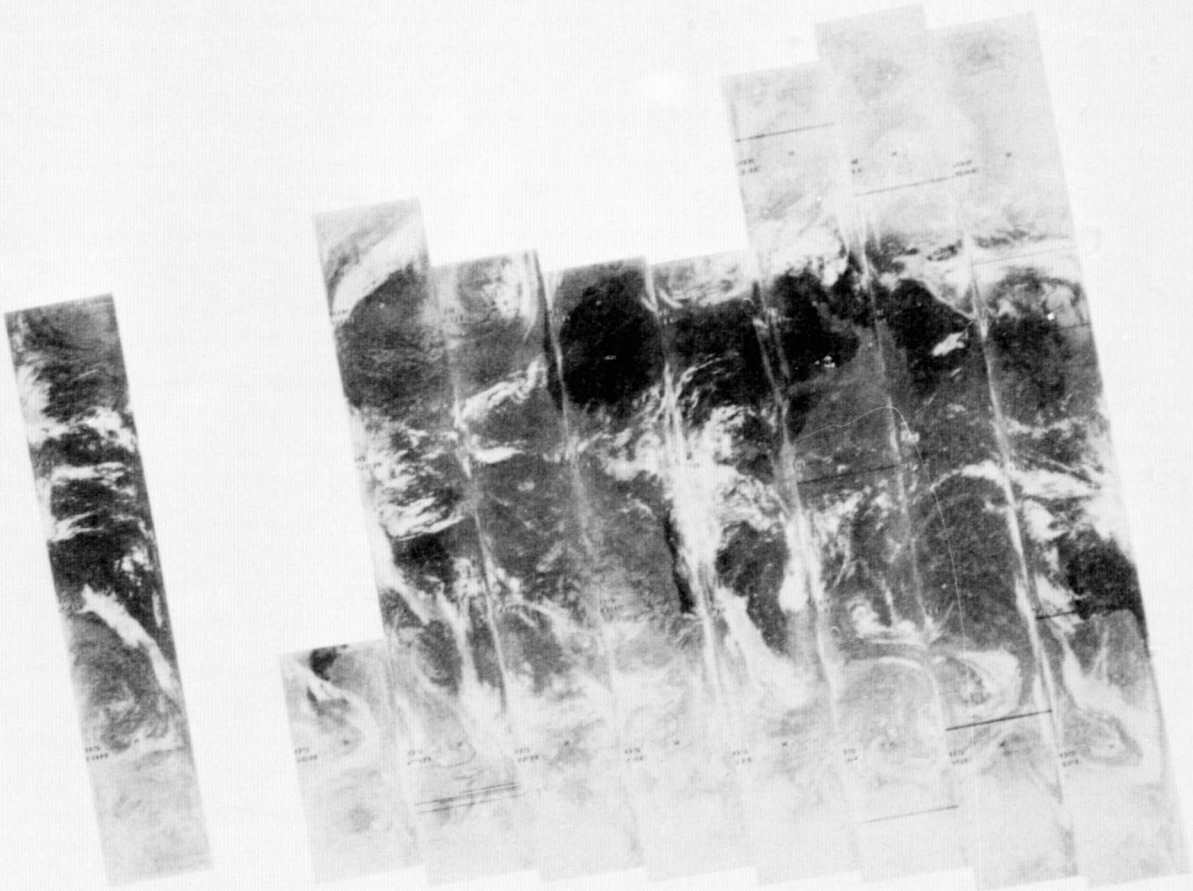
DAYTIME MONTAGES



8422 8421 8420 8419 8418 8417 8416 8415 8414 8413 8412 8411 8410

1 MAR 77

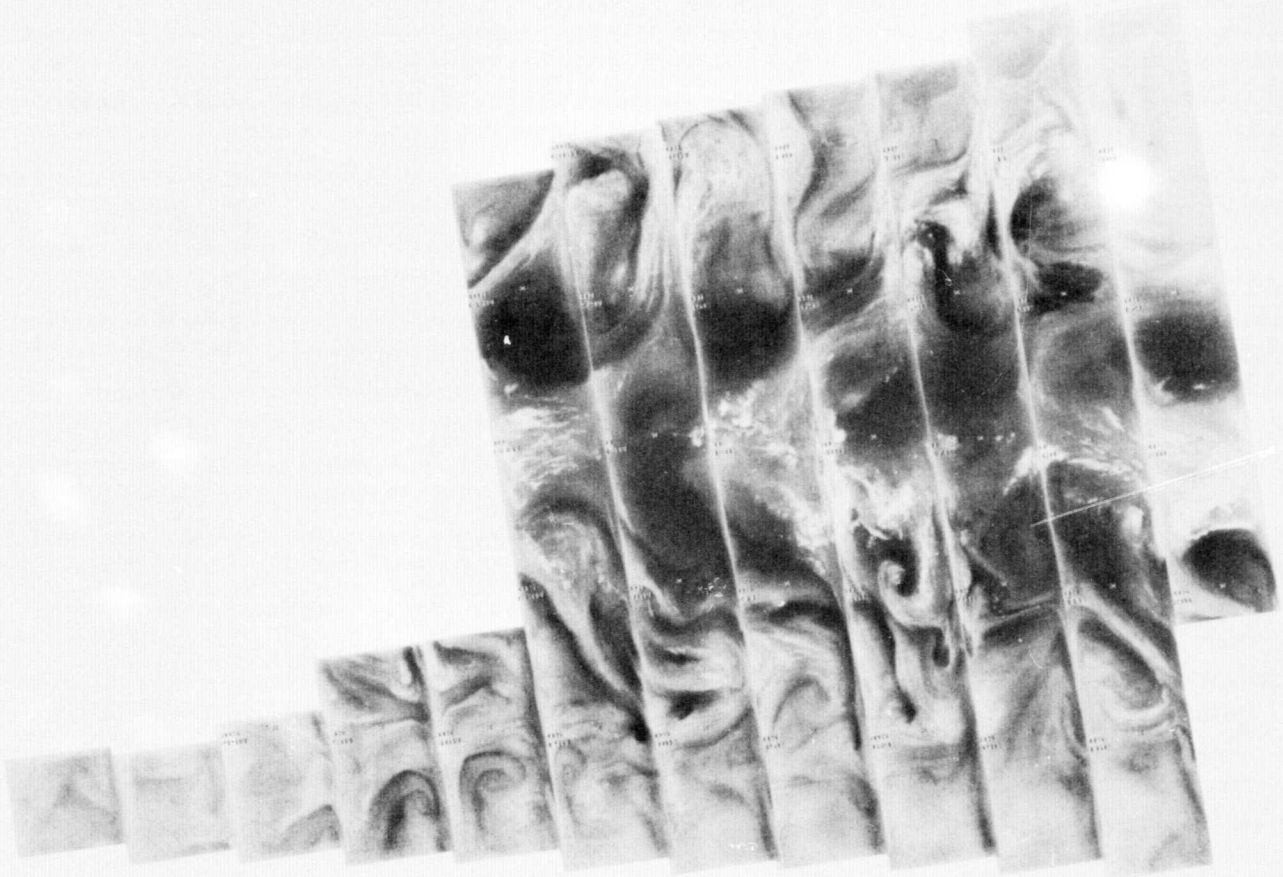
6.7 μm



8422 8421 8420 8419 8418 8417 8416 8115 8414 8413 8412 8411 8410

1 MAR 77

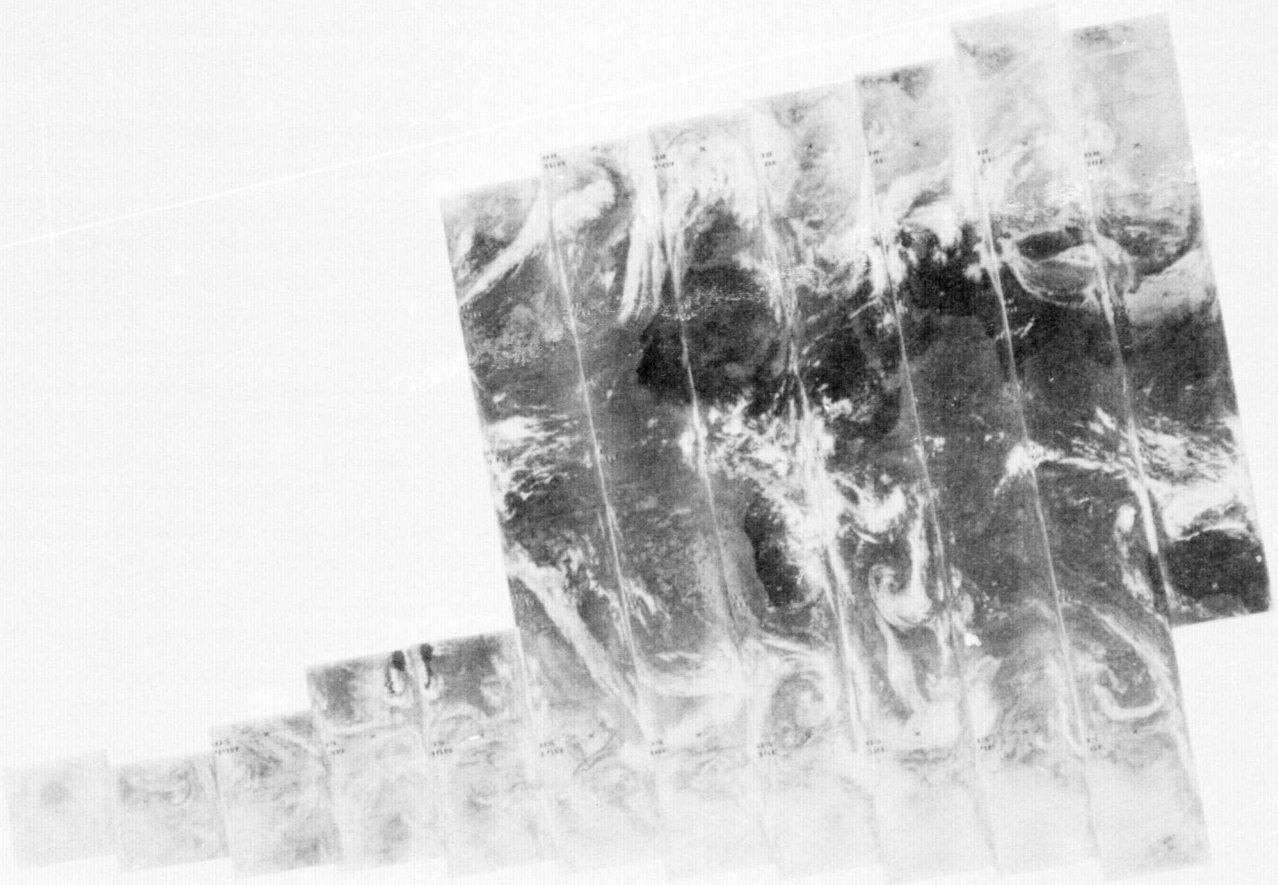
11.5 μm



8436 8435 8434 8433 8432 8431 8430 8429 8428 8427 8426 8425 8424 8423

2 MAR 77

6.7 μm



8436 8435 8434 8433 8432 8431 8430 8429 8428 8427 8426 8425 8424 8423

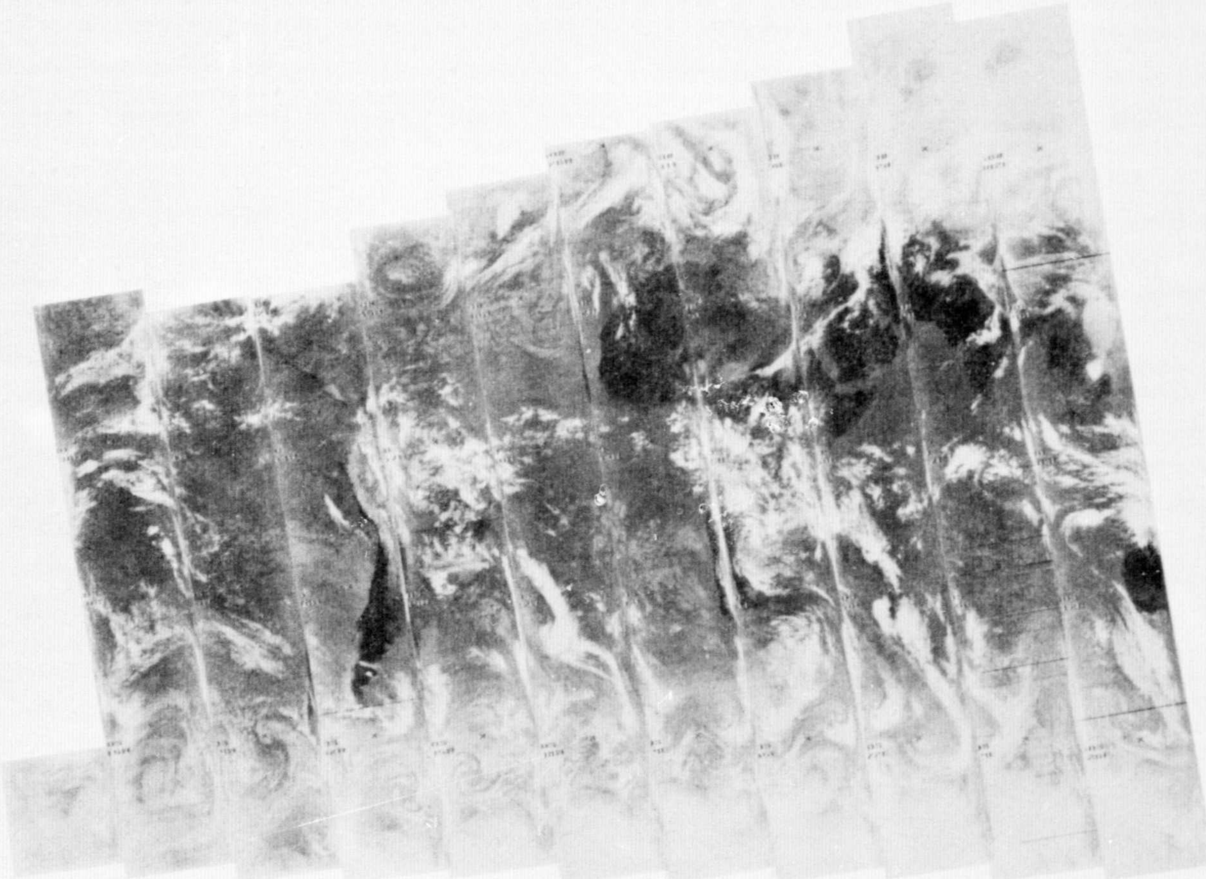
2 MAR 77

11.5 μm

8449 8448 8447 8446 8445 8444 8443 8442 8441 8440 8439 8438 8437

3 MAR 77

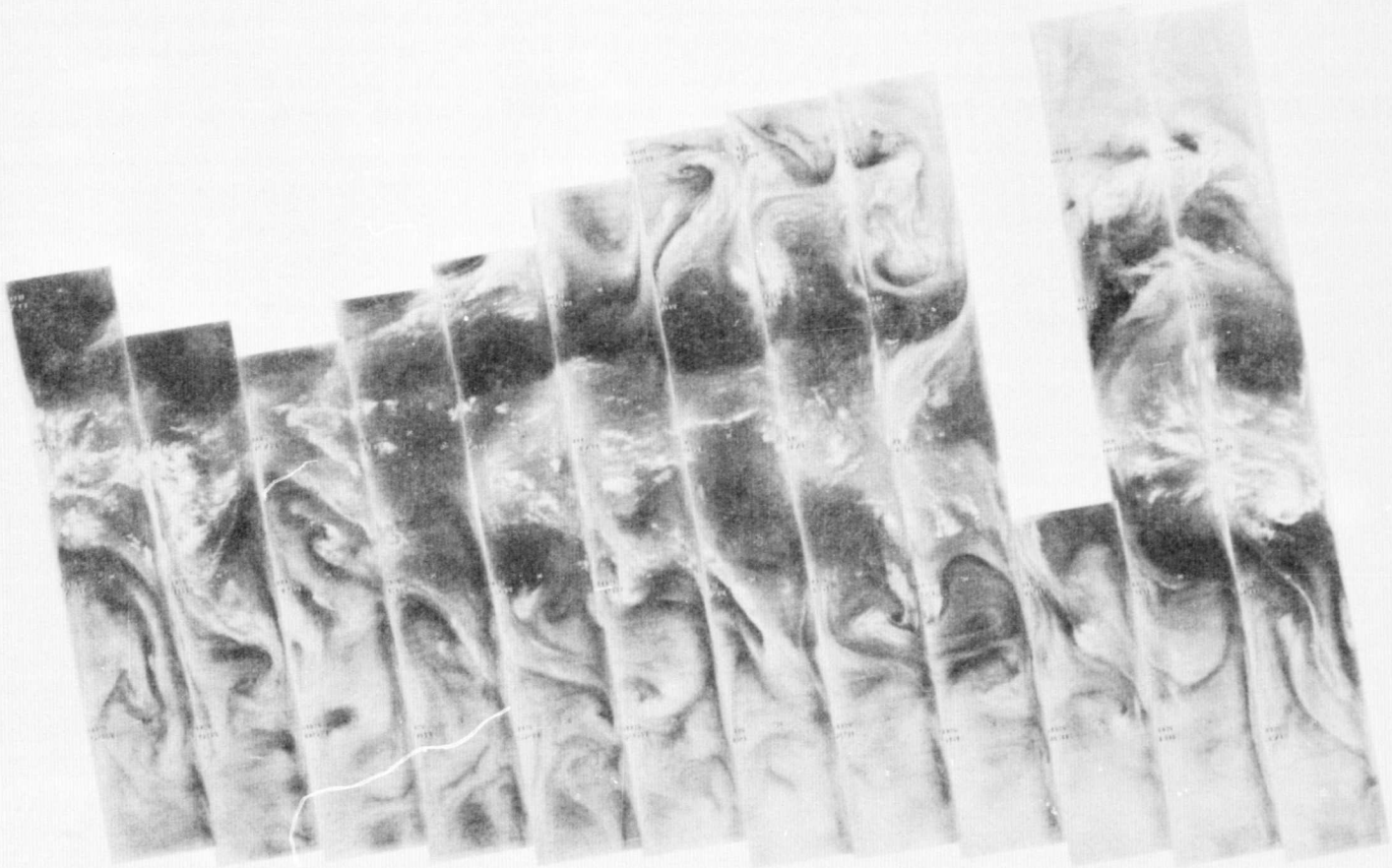
6.7 μm



8449 8448 8447 8446 8445 8444 8443 8442 8441 8440 8439 8438 8437

3 MAR 77

11.5 μm



8463 8462 8461 8460 8459 8458 8457 8456 8455 8454 8453 8452 8451 8450

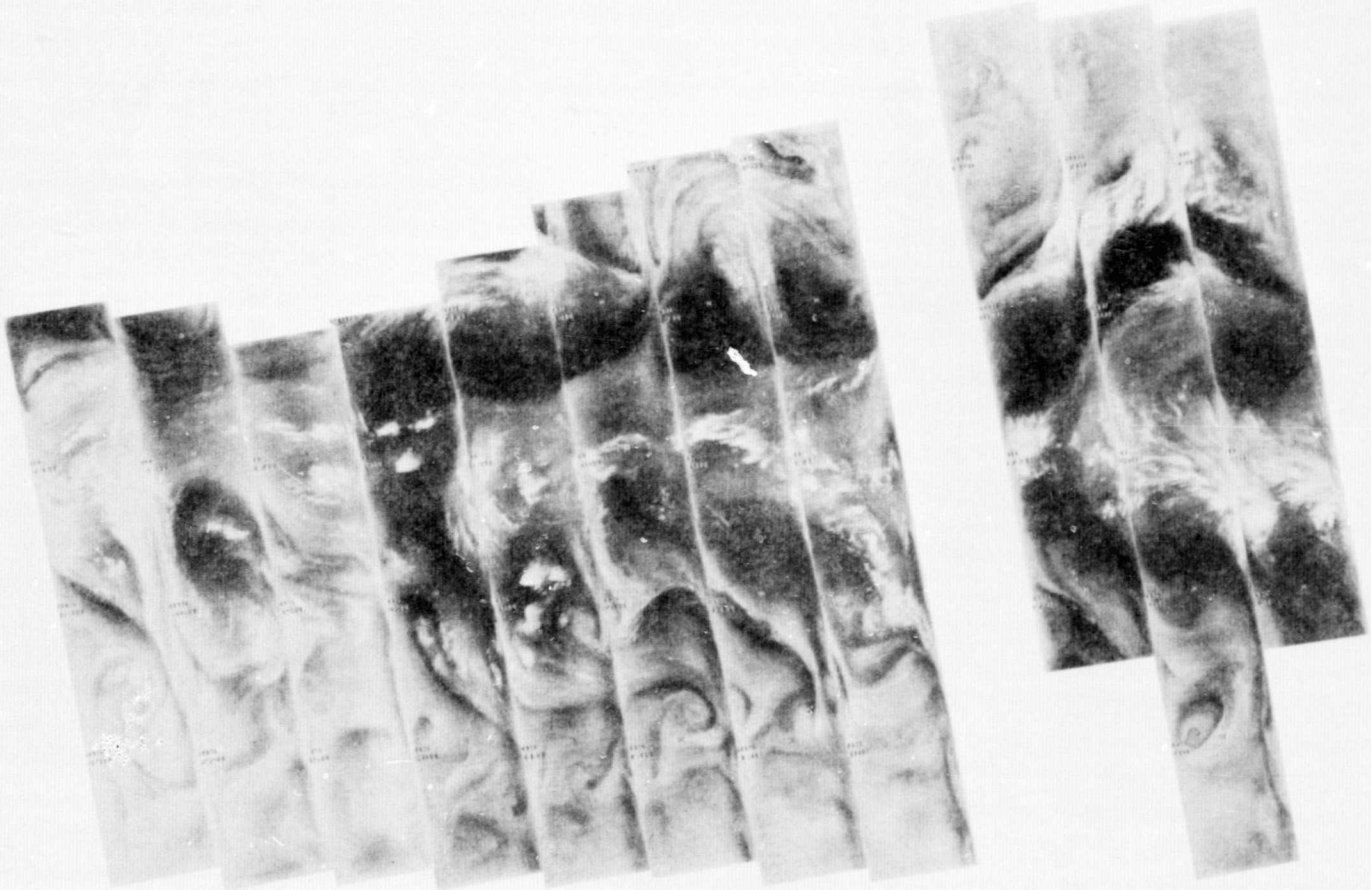
4 MAR 77

6.7 μm

8463 8462 8461 8460 8459 8458 8457 8456 8455 8454 8453 8452 8451 8450

4 MAR 77

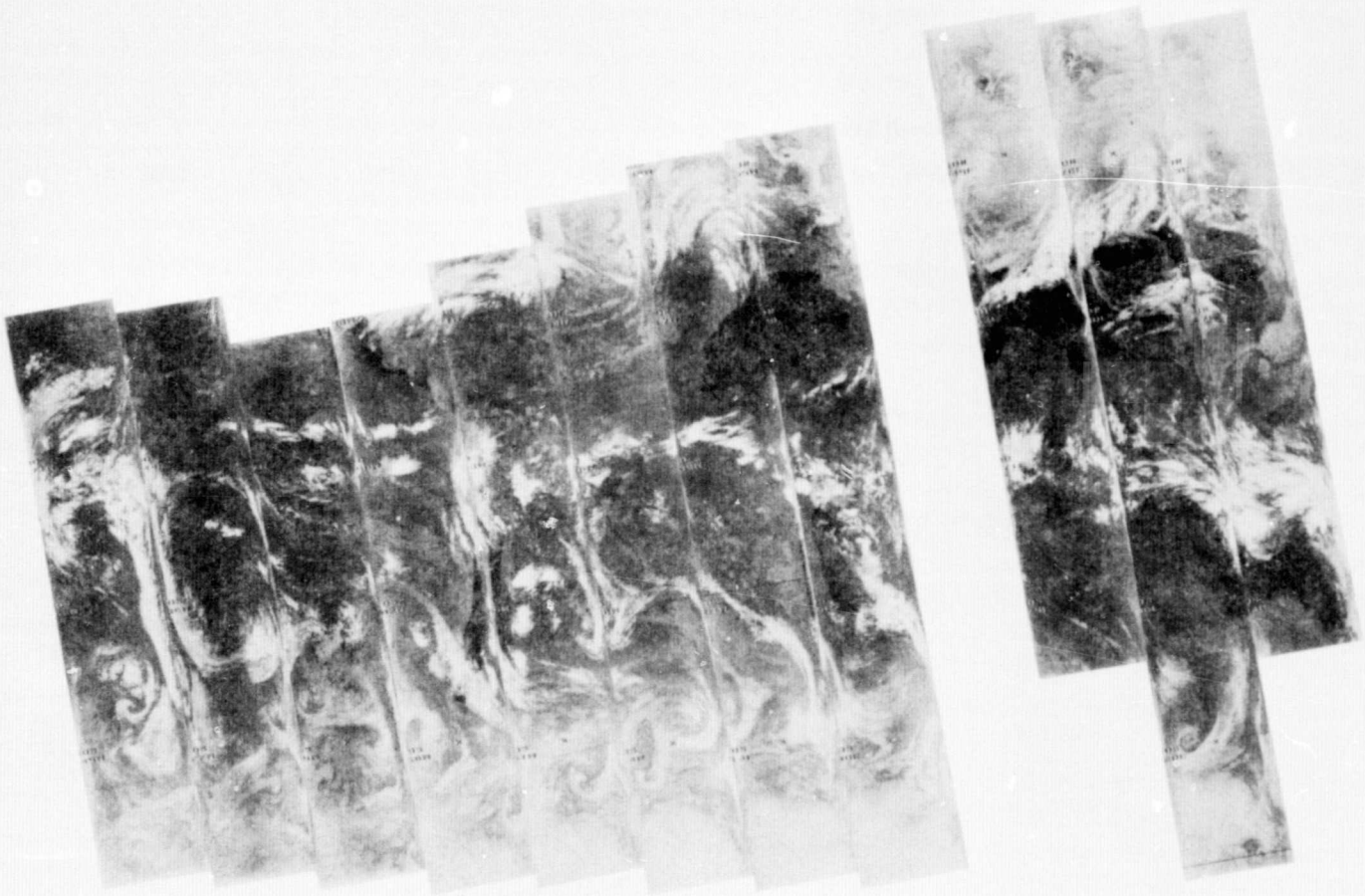
11.5 μm



8476 8475 8474 8473 8472 8471 8470 8469 8468 8467 8466 8465 8464

5 MAR 77

6.7μm



8476 8475 8474 8473 8472 8471 8470 8469 8468 8467 8466 8465 8464

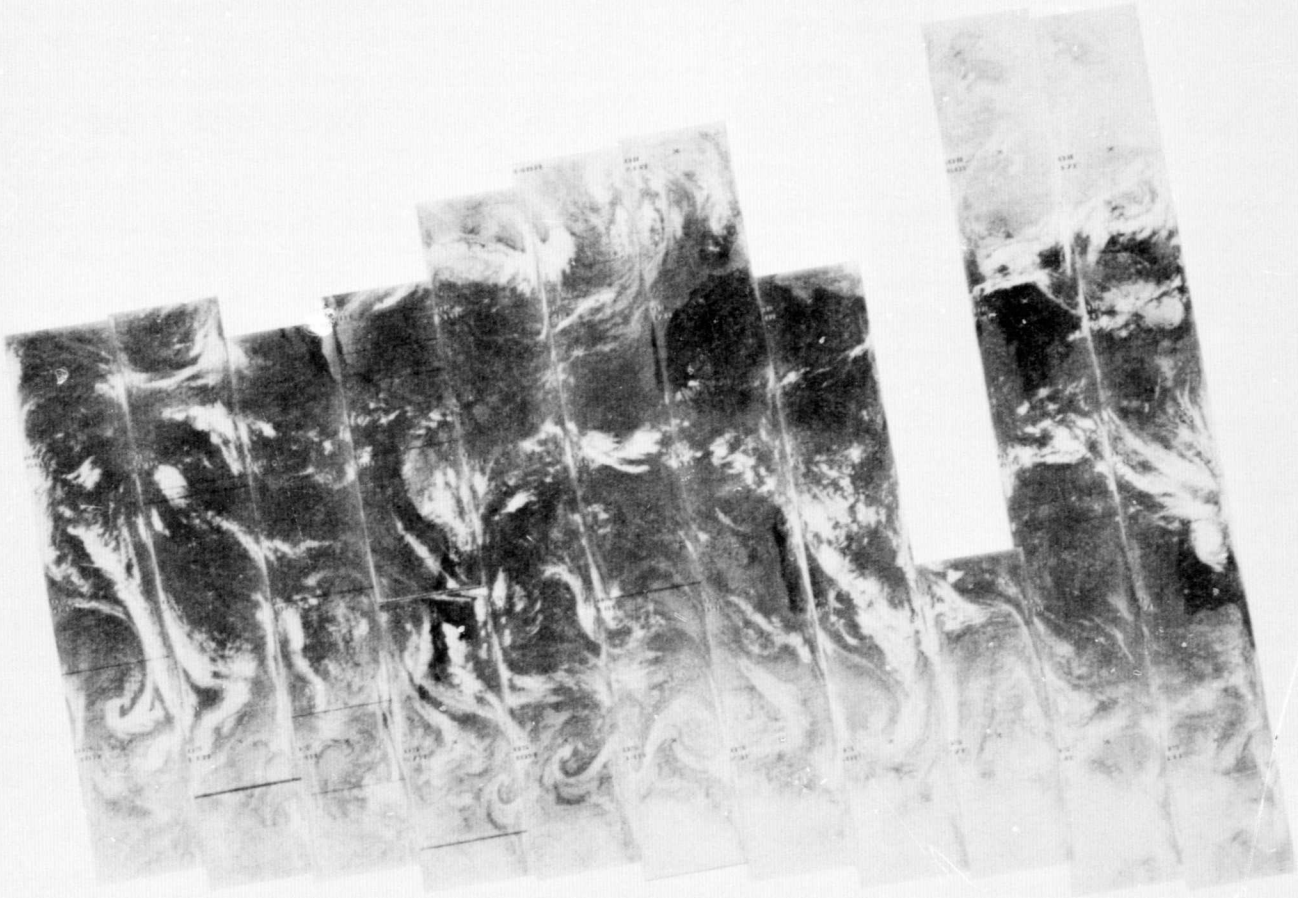
5 MAR 77

11.5 μm

8489 8488 8487 8486 8485 8484 8483 8482 8481 8480 8479 8478 8477

6 MAR 77

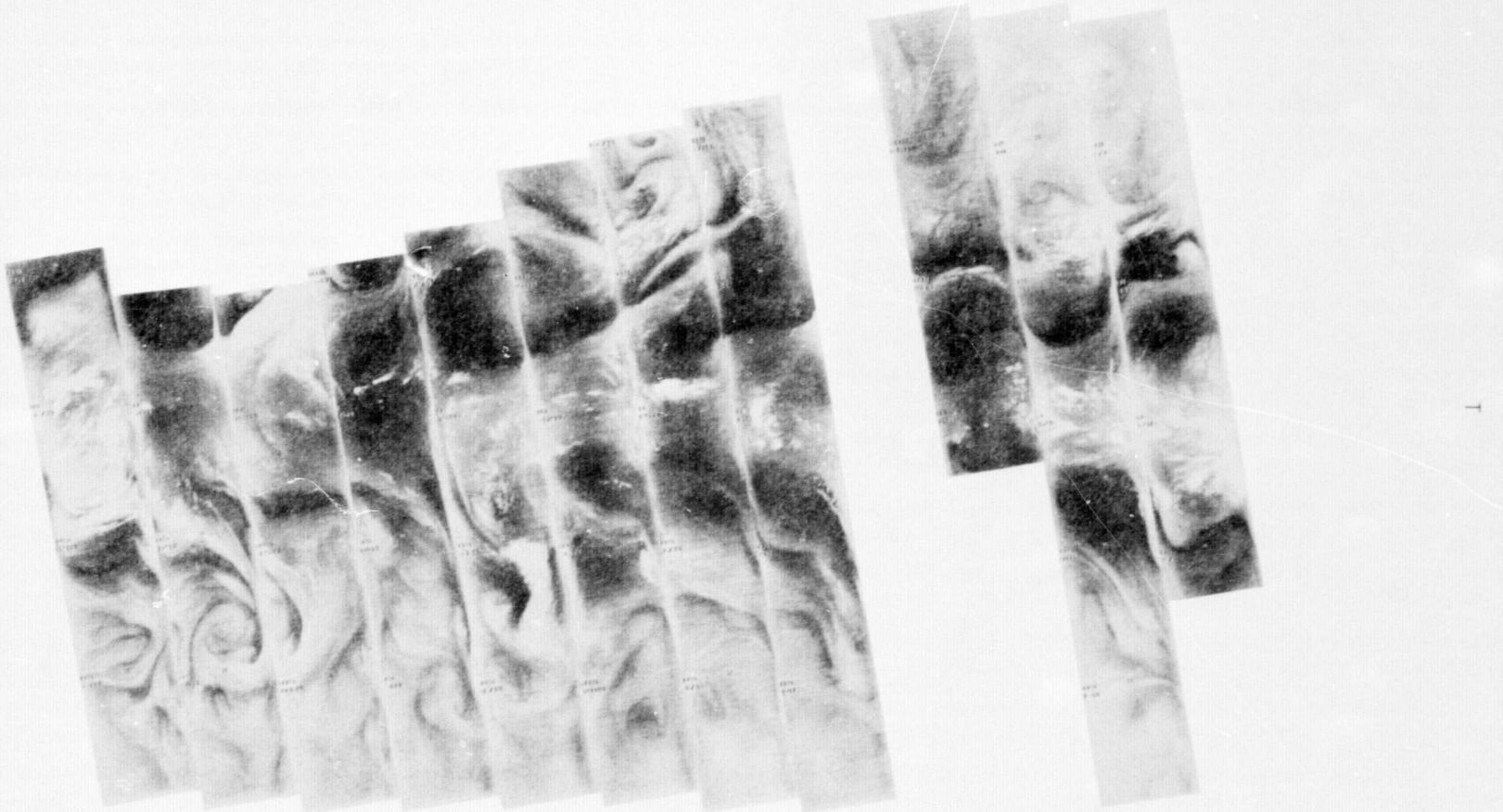
6.7 μm



8489 8488 8487 8486 8485 8484 8483 8482 8481 8480 8479 8478 8477

6 MAR 77

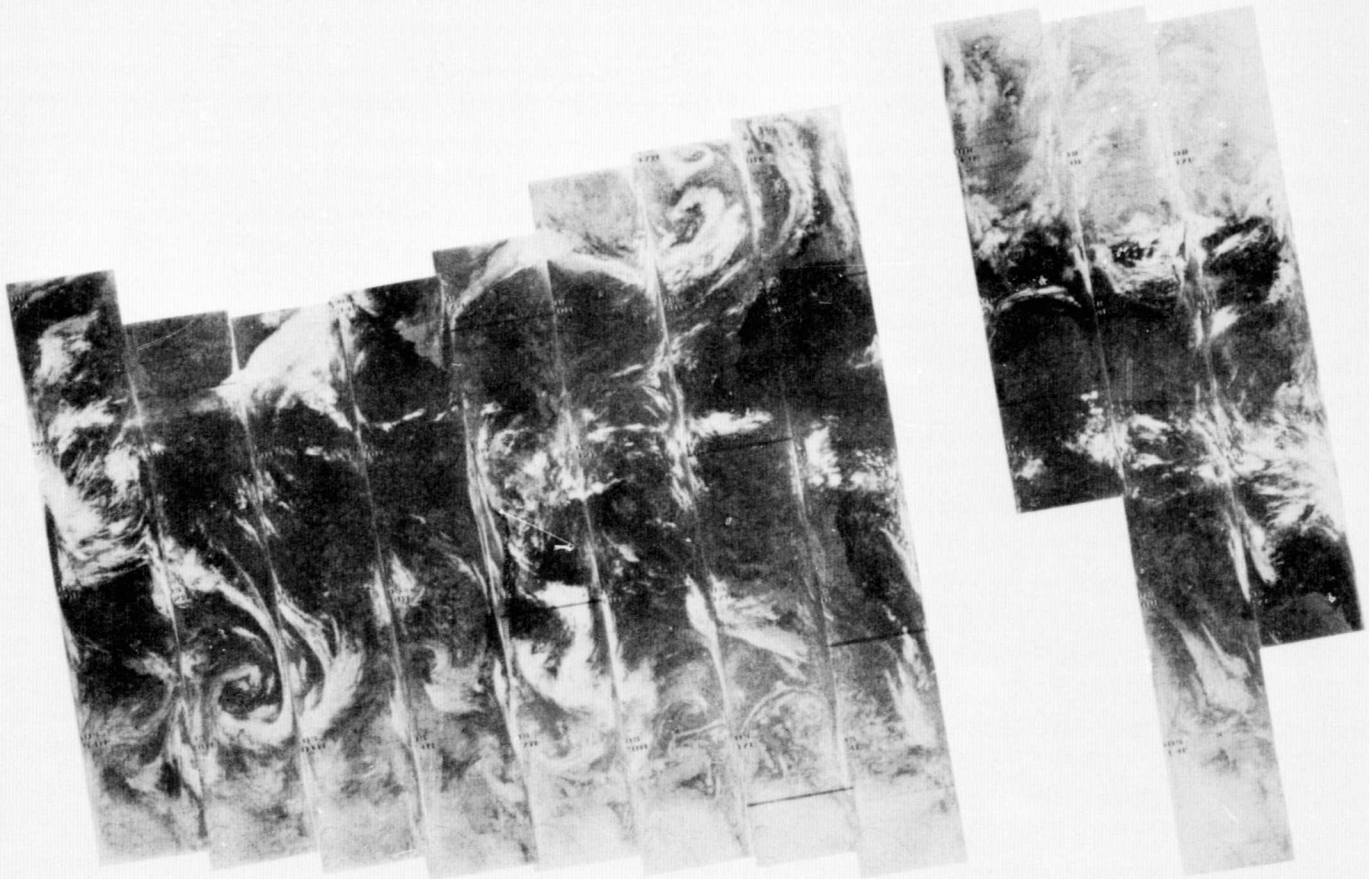
11.5 μm



8503 8502 8501 8500 8499 8498 8497 8496 8495 8494 8493 8492 8491 8490

7 MAR 77

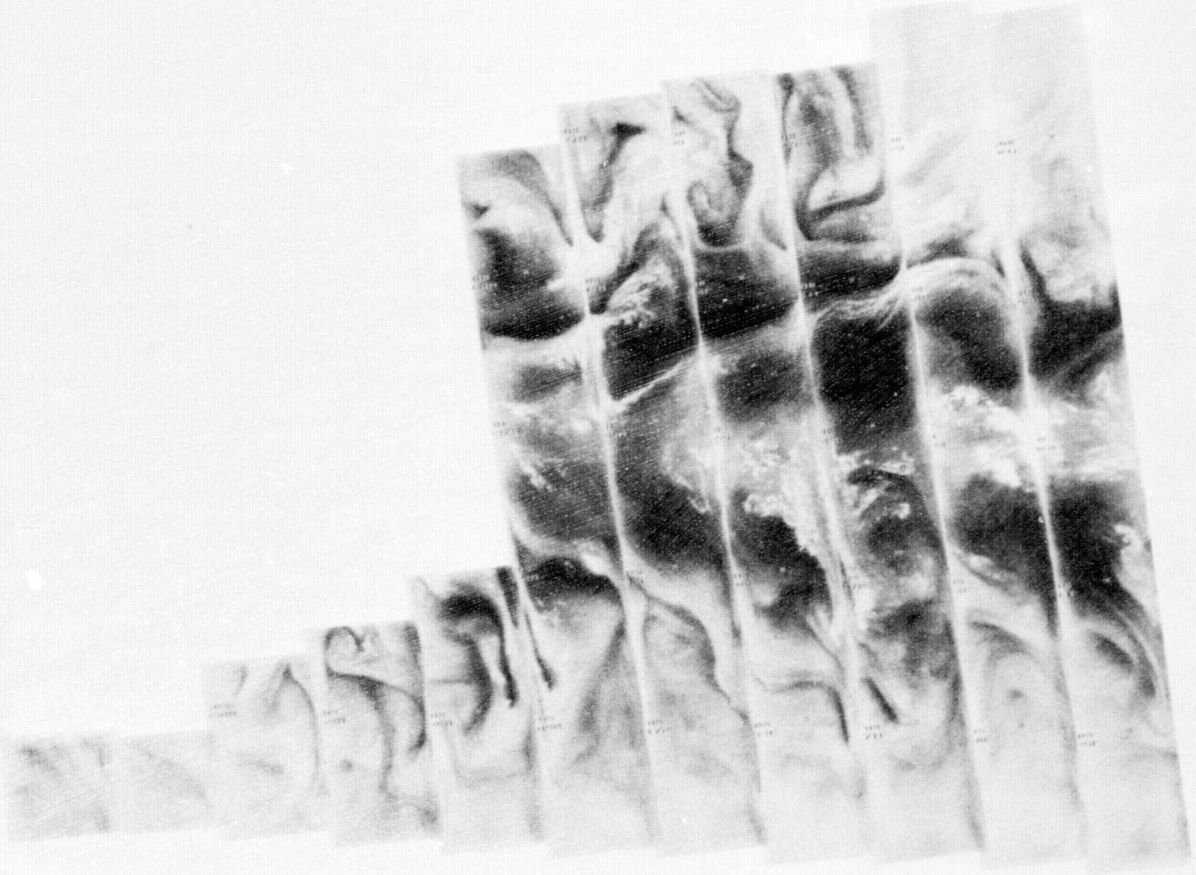
6.7 μm



8503 8502 8501 8500 8499 8498 8497 8496 8495 8494 8493 8492 8491 8490

7 MAR 77

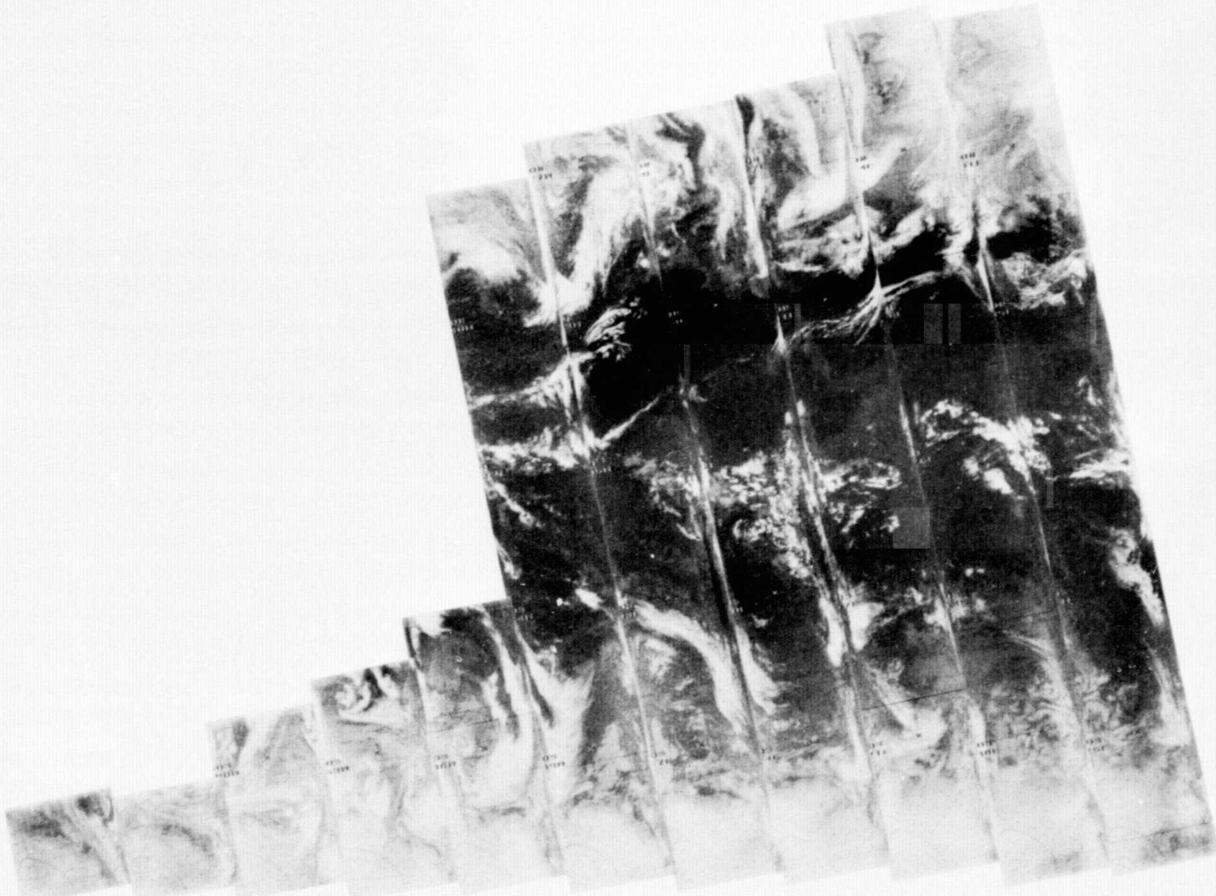
11.5 μm



8516 8515 8514 8513 8512 8511 8510 8509 8508 8507 8506 8505 8504

8 MAR 77

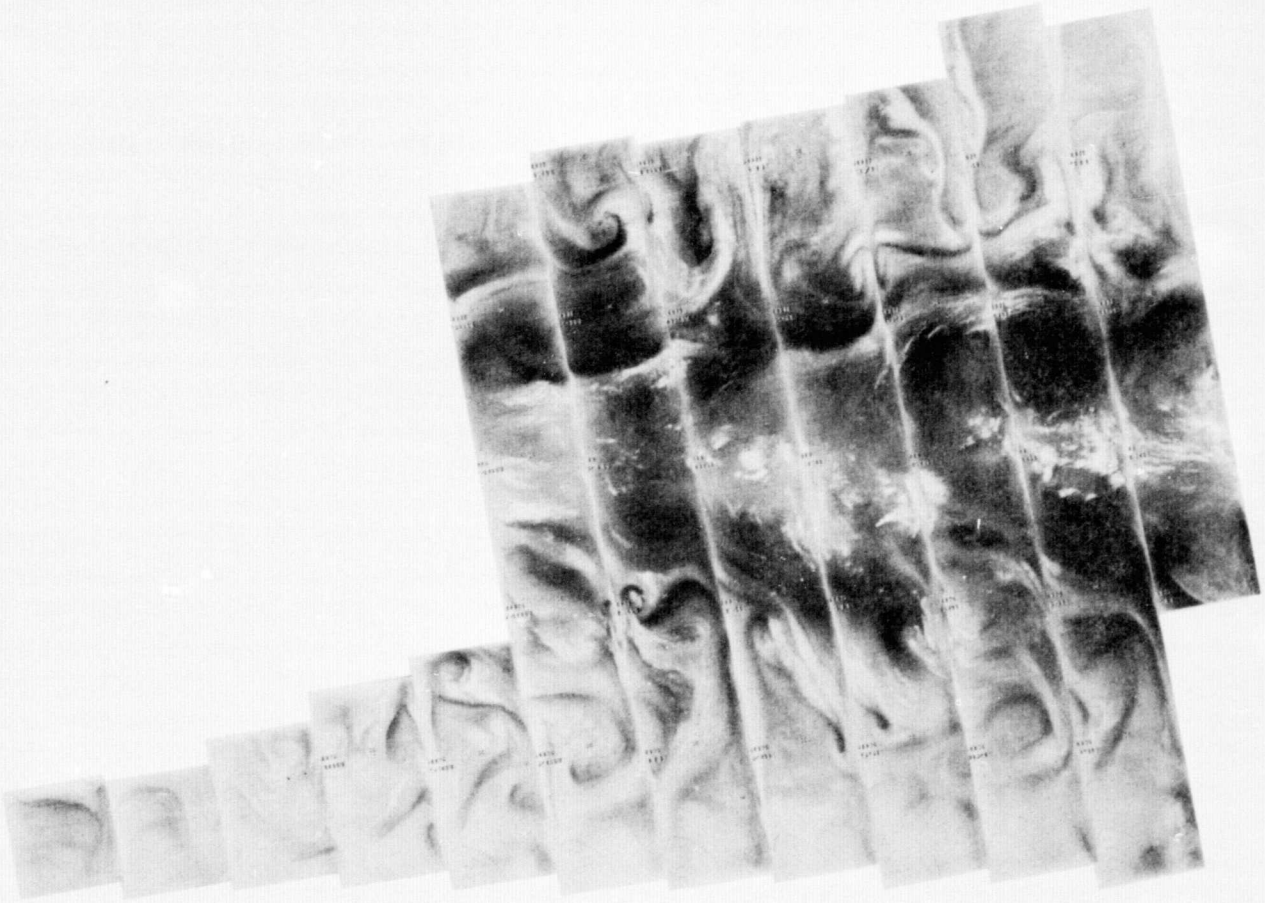
6.7 μm



8516 8515 8514 8513 8512 8511 8510 8509 8508 8507 8506 8505 8504

8 MAR 77

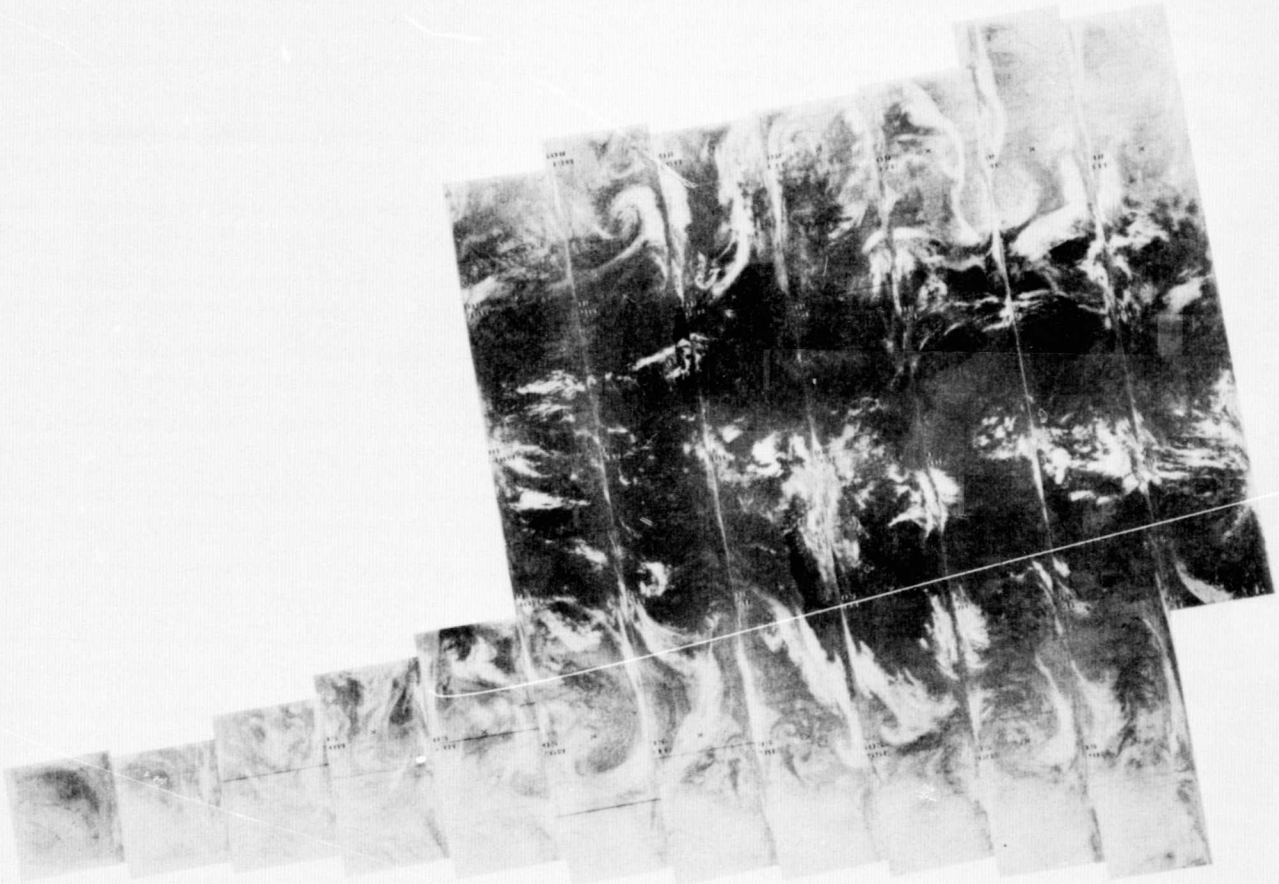
11.5 μm



8530 8529 8528 8527 8526 8525 8524 8523 8522 8521 8520 8519 8518 8517

9 MAR 77

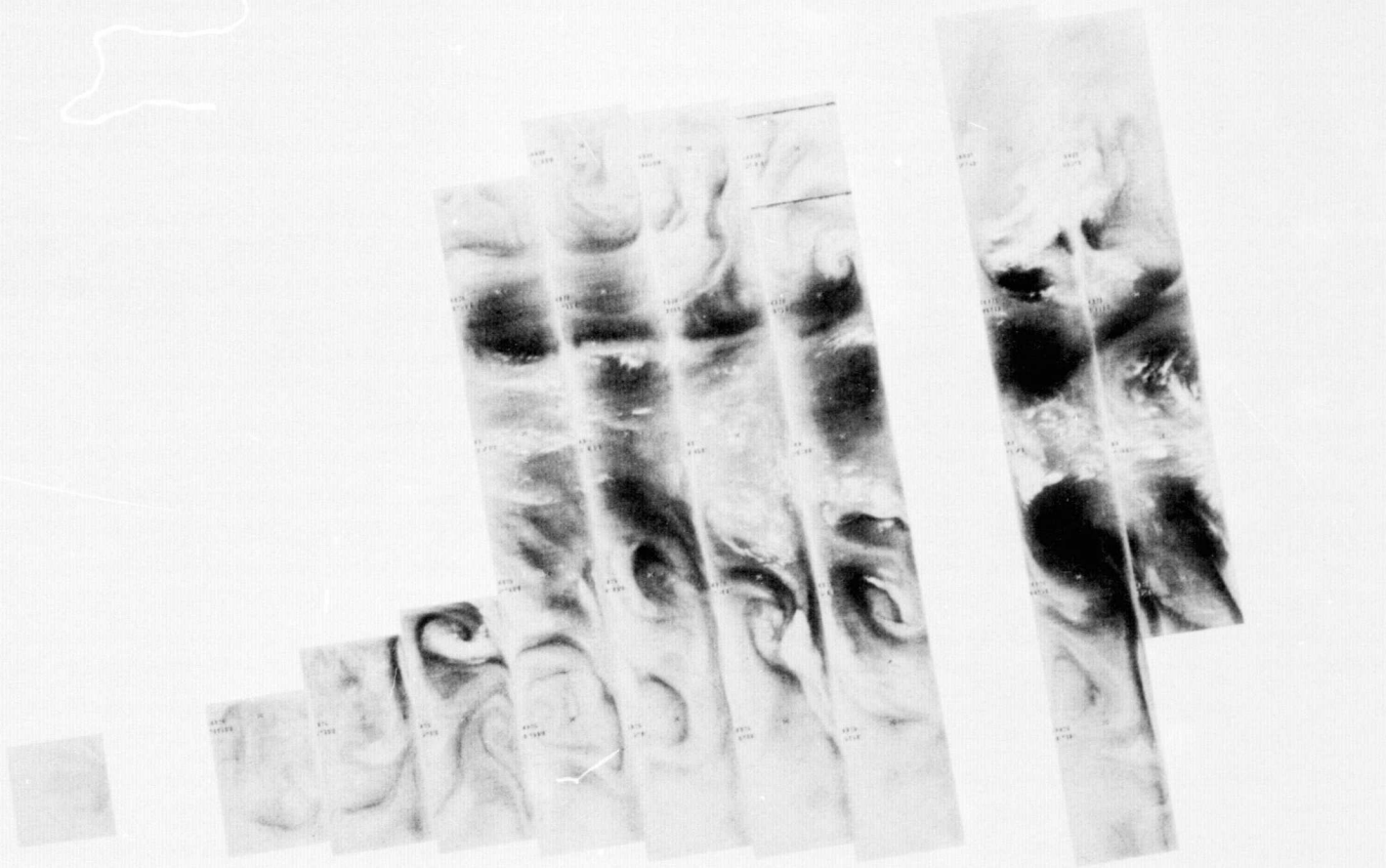
6.7 μm



8530 8529 8528 8527 8526 8525 8524 8523 8522 8521 8520 8519 8518 8517

9 MAR 77

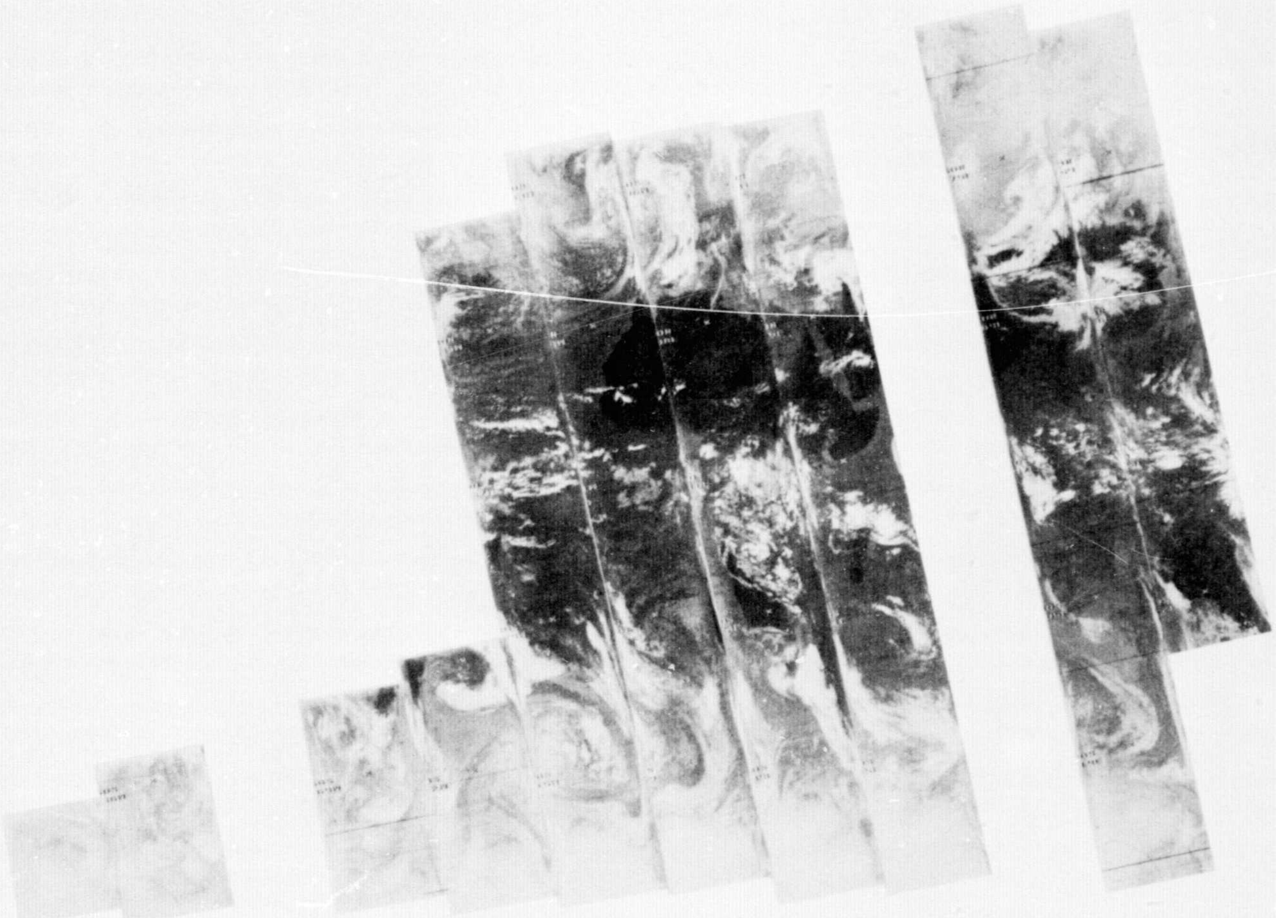
11.5 μm



8543 8542 8541 8540 8539 8538 8537 8536 8535 8534 8533 8532 8531

10 MAR 77

6.7 μm



8543 8542 8541 8540 8539 8538 8537 8536 8535 8534 8533 8532 8531

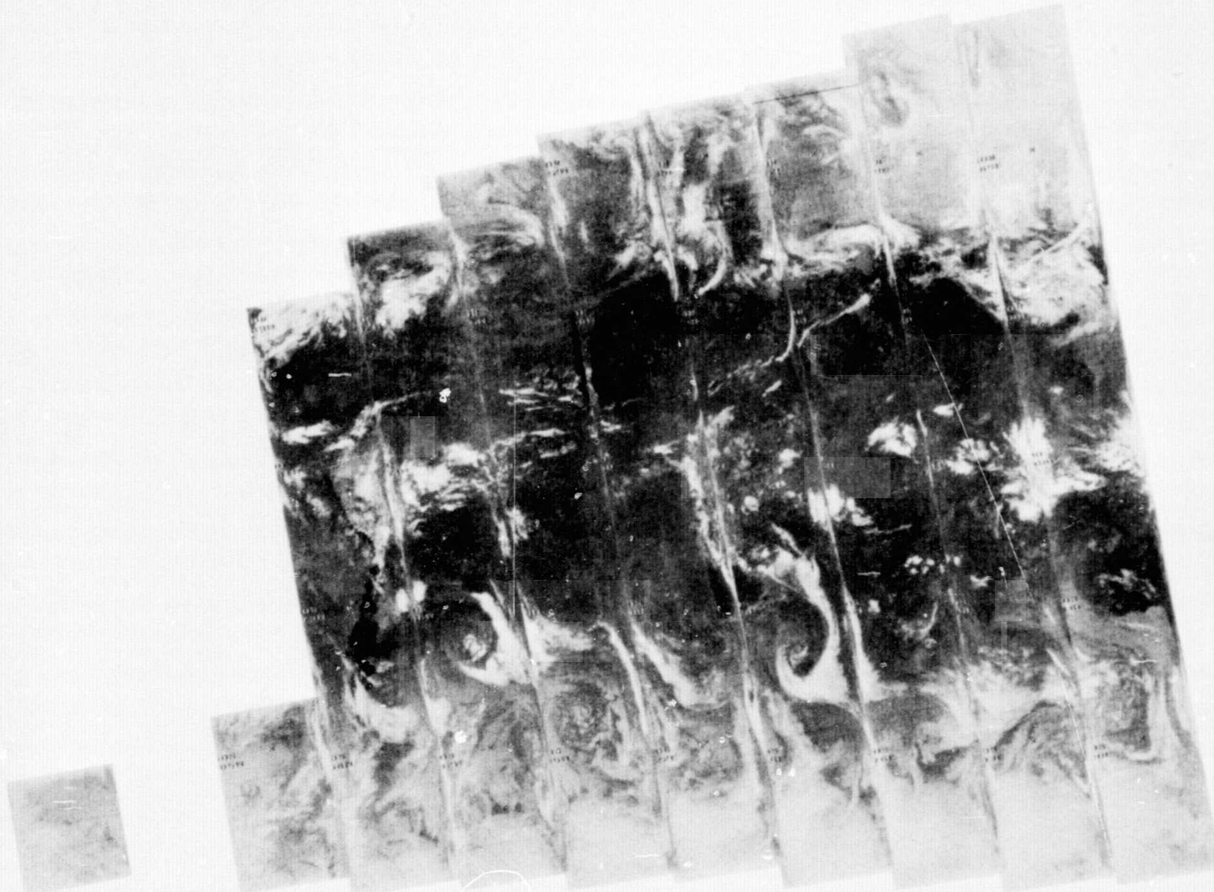
10 MAR 77

11.5 μm

8556 8555 8554 8553 8552 8551 8550 8549 8548 8547 8546 8545 8544

11 MAR 77

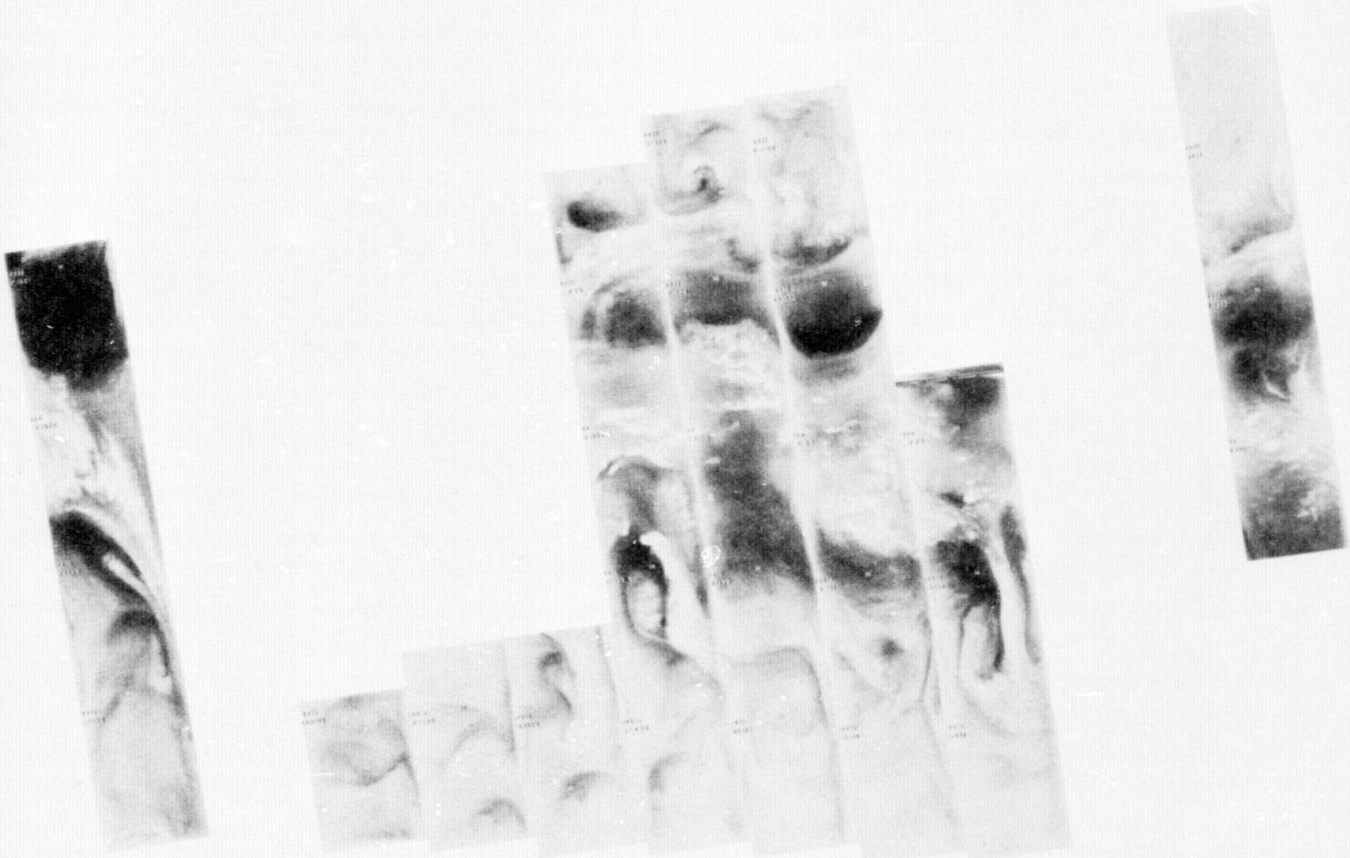
6.7 μm



8556 8555 8554 8553 8552 8551 8550 8549 8548 8547 8546 8545 8544

11 MAR 77

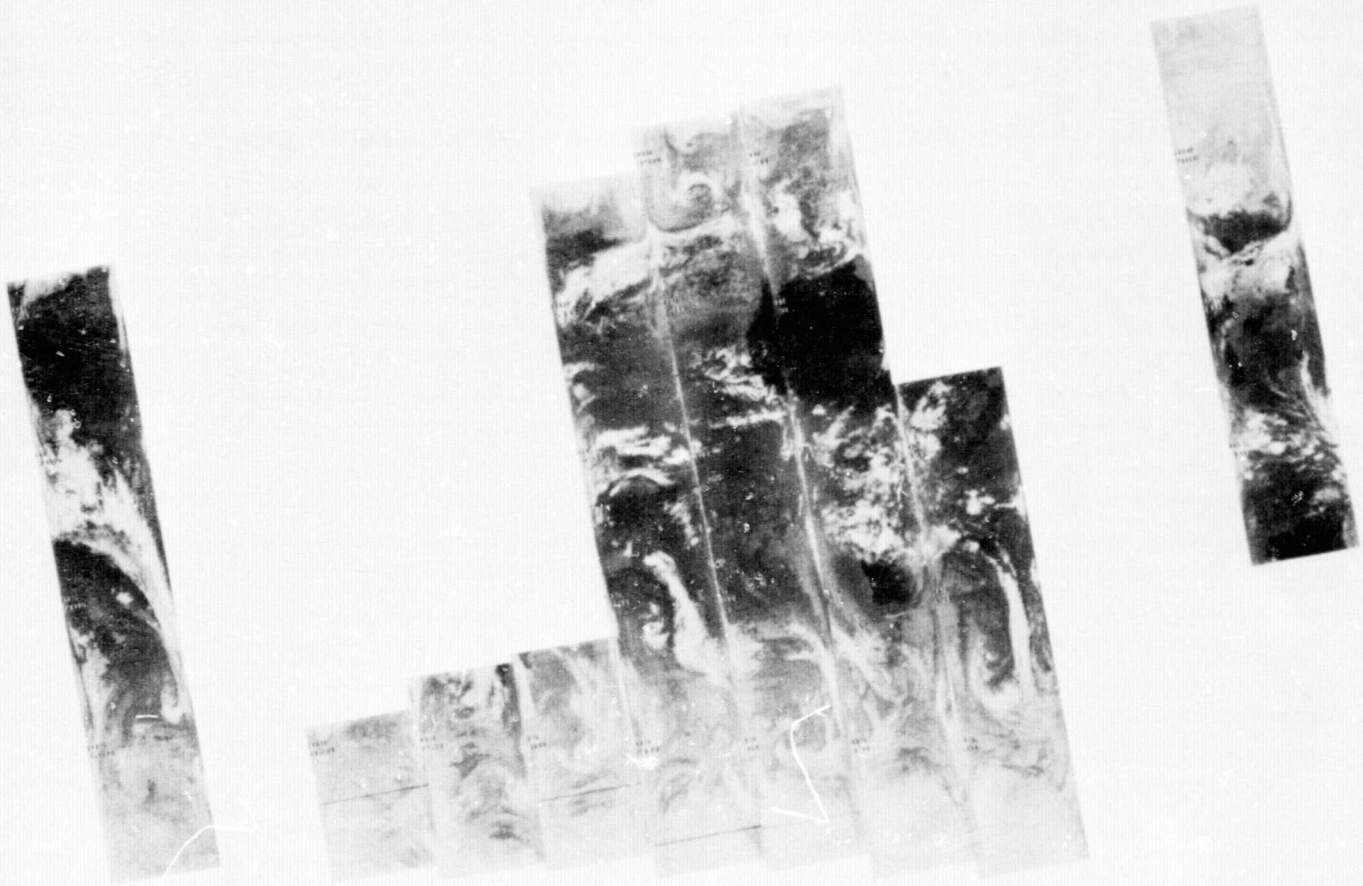
11.5 μm



8570 8569 8568 8567 8566 8565 8564 8563 8562 8561 8560 8559 8558 8557

12 MAR 77

6.7 μm



8570 8569 8568 8567 8566 8565 8564 8563 8562 8561 8560 8559 8558 8557

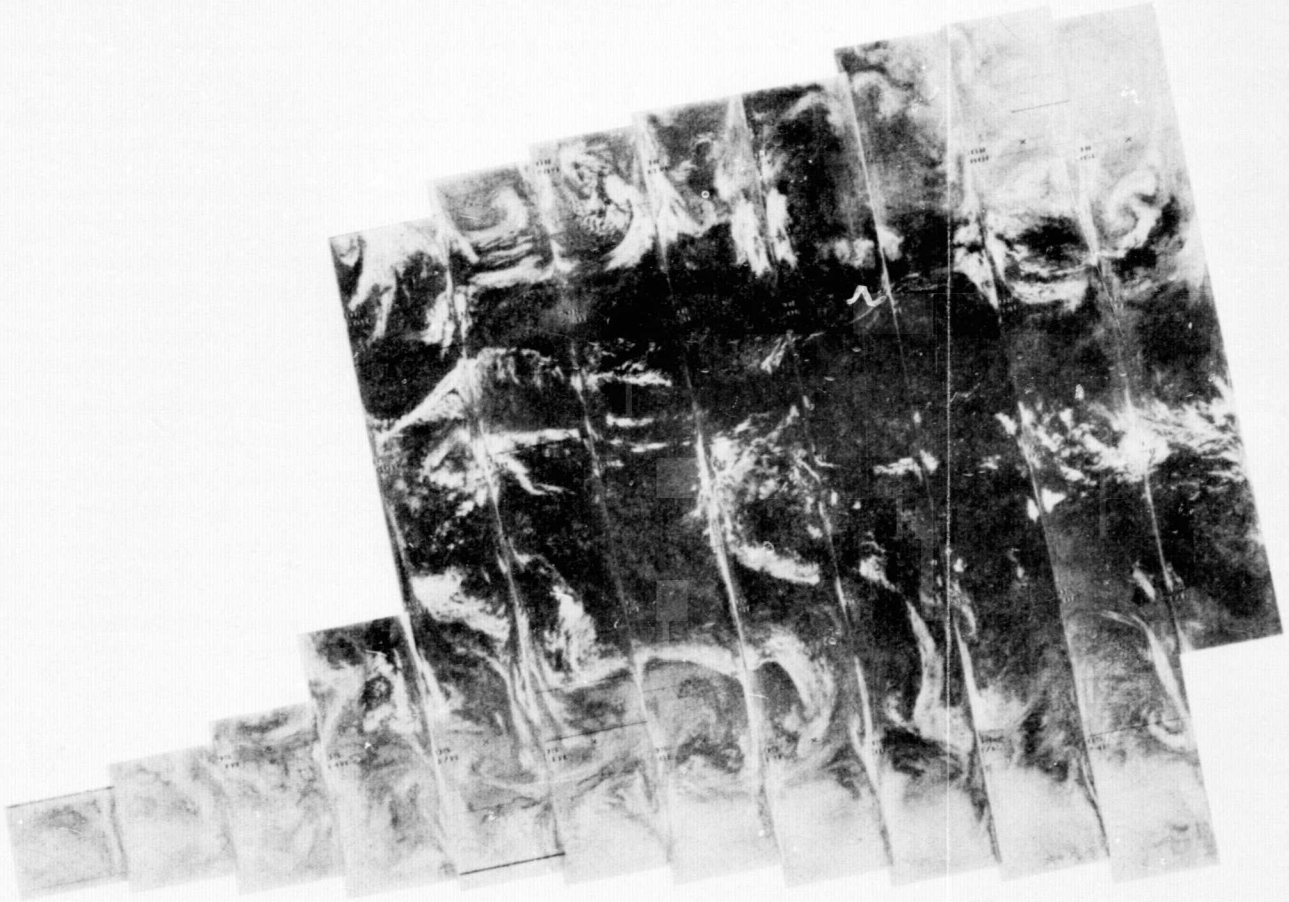
12 MAR 77

11.5 μm

8583 8582 8581 8580 8579 8578 8577 8576 8575 8574 8573 8572 8571

13 MAR 77

6.7 μm



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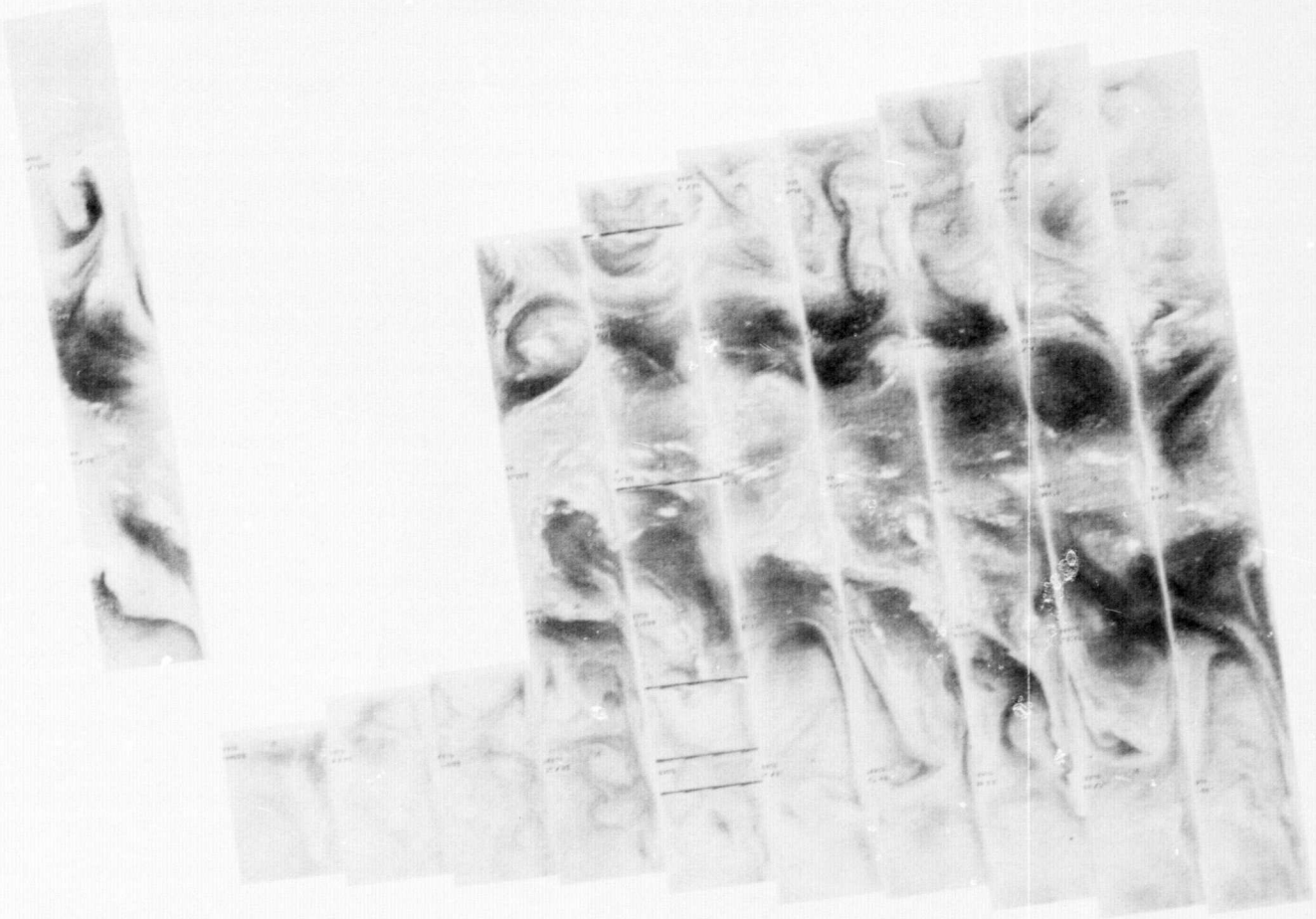
13 MAR 77

11.5 μm



8597 8596 8595 8594 8593 8592 8591 8590 8589 8588 8587 8586 8585 8584

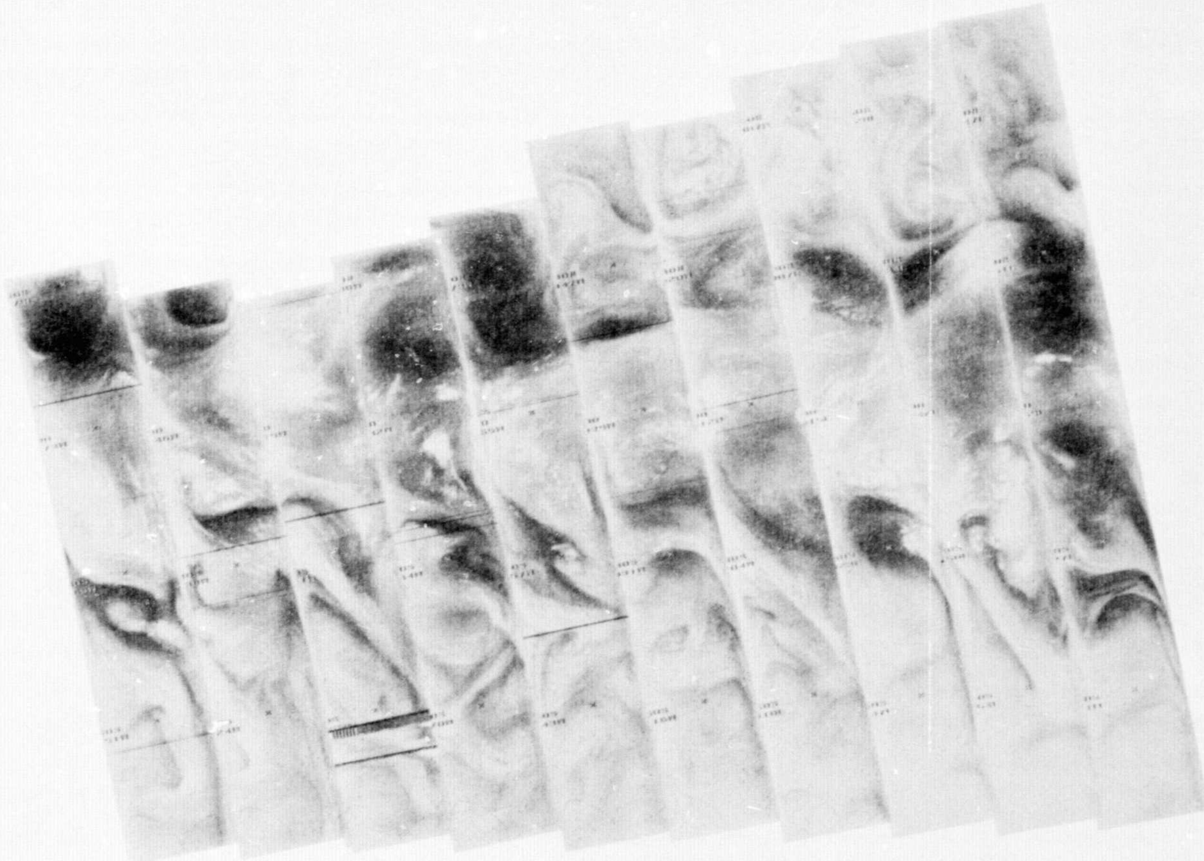
14 MAR 77

6.7 μm

8597 8596 8595 8594 8593 8592 8591 8590 8589 8588 8587 8586 8585 8584

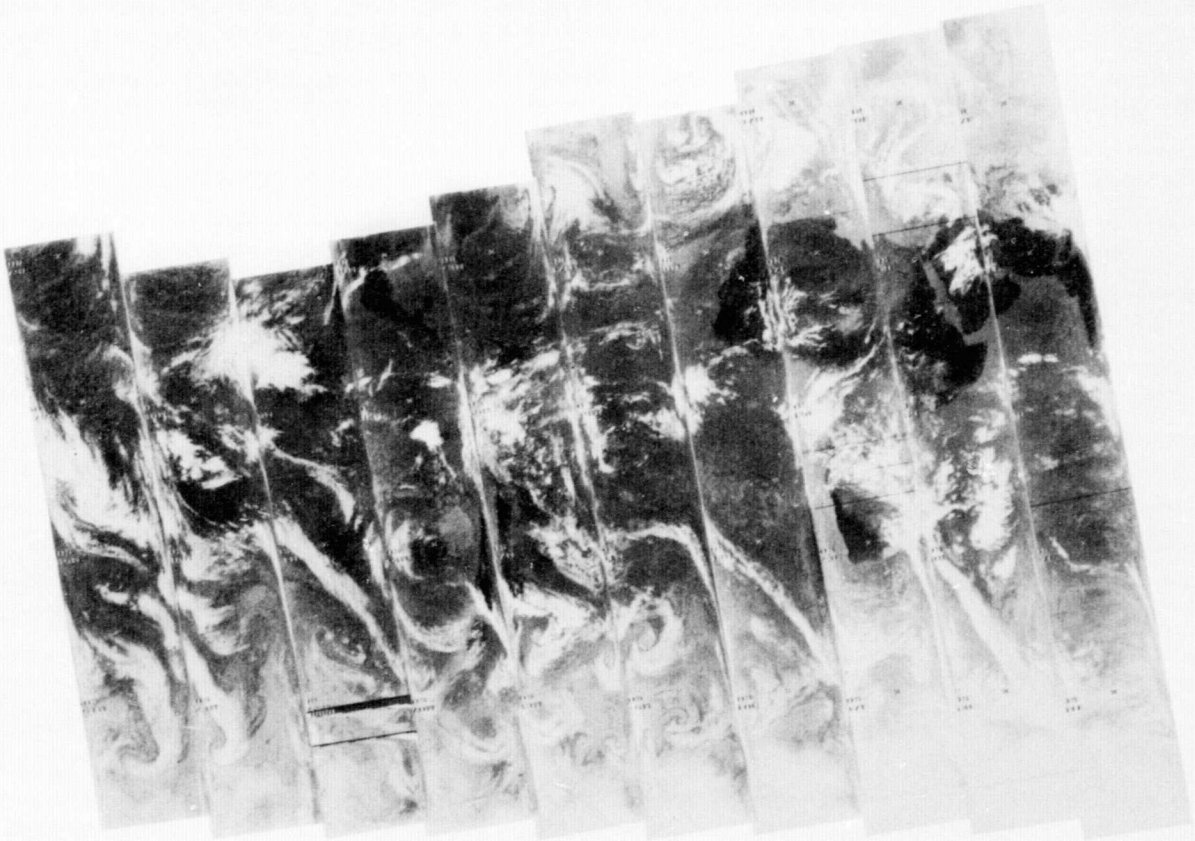
14 MAR 77

11.5 μm



15 MAR 77

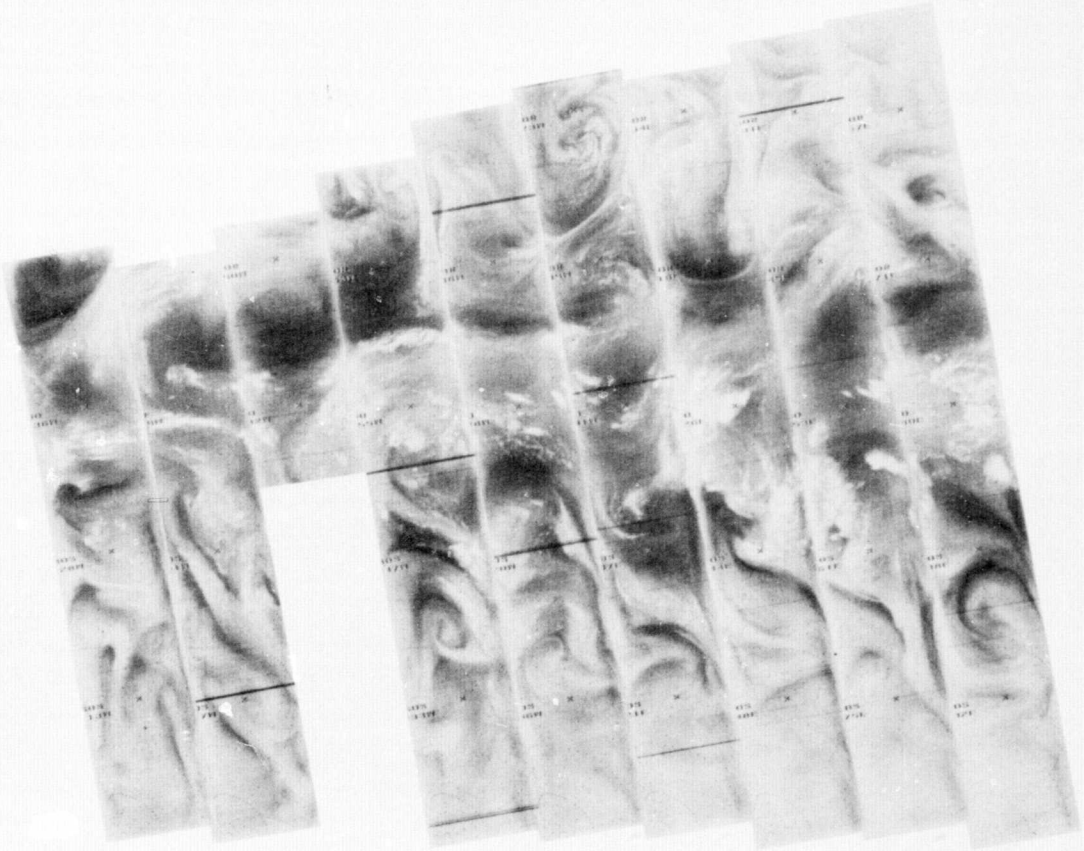
6.7 μm



8610 8609 8608 8607 8606 8605 8604 8603 8602 8601 8600 8599 8598

15 MAR 77

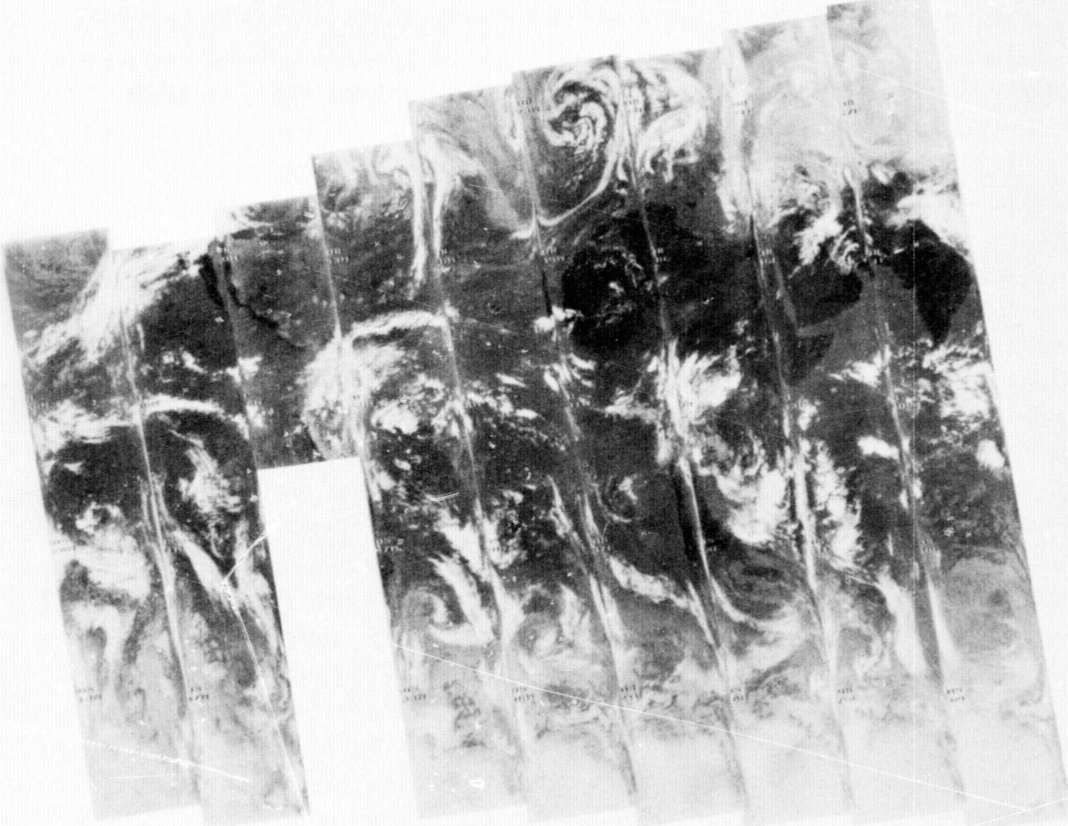
11.5 μm



8623 8622 8621 8620 8619 8618 8617 8616 8615 8614 8613 8612 8611

16 MAR 77

6.7 μm



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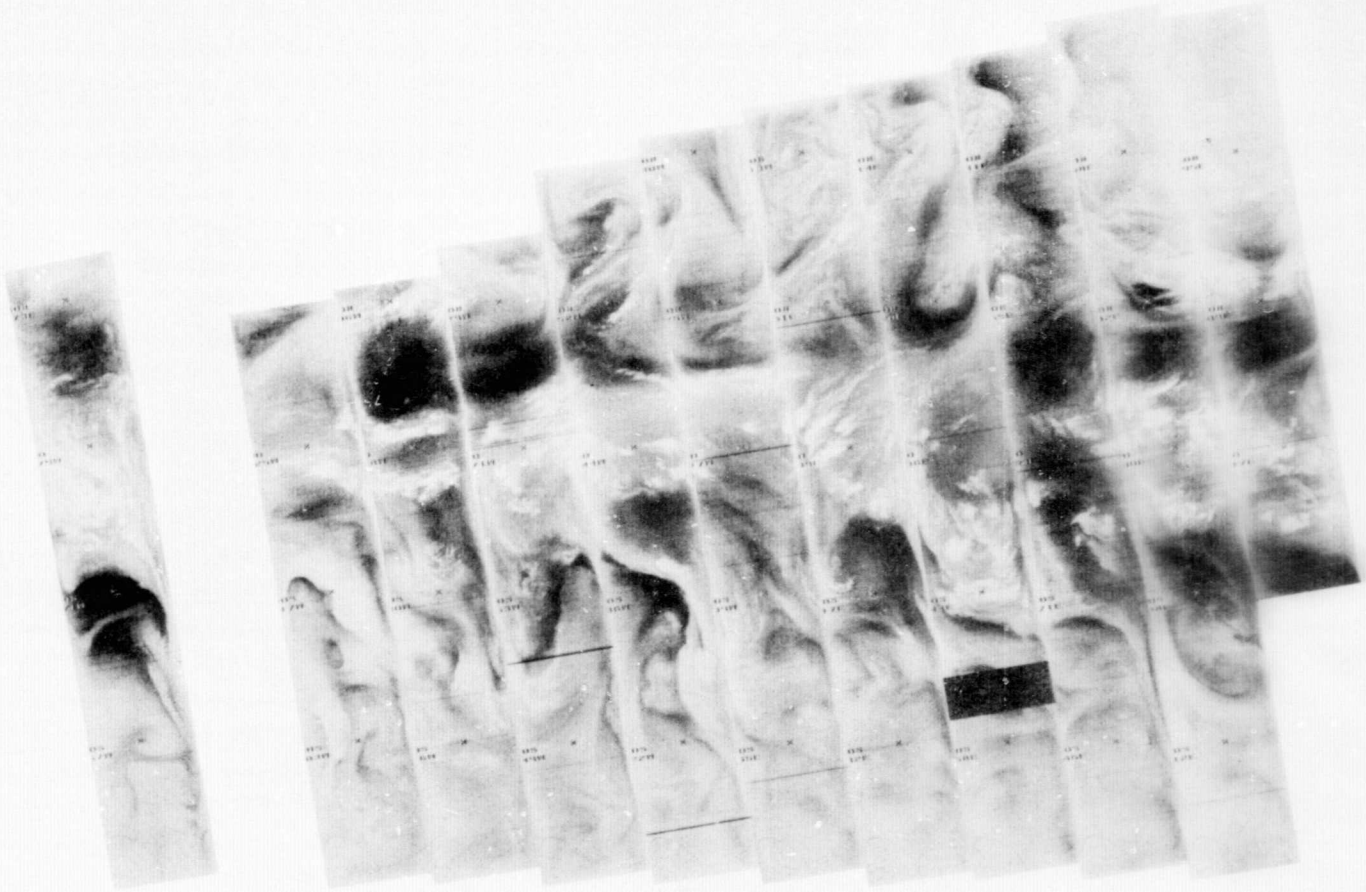
16 MAR 77

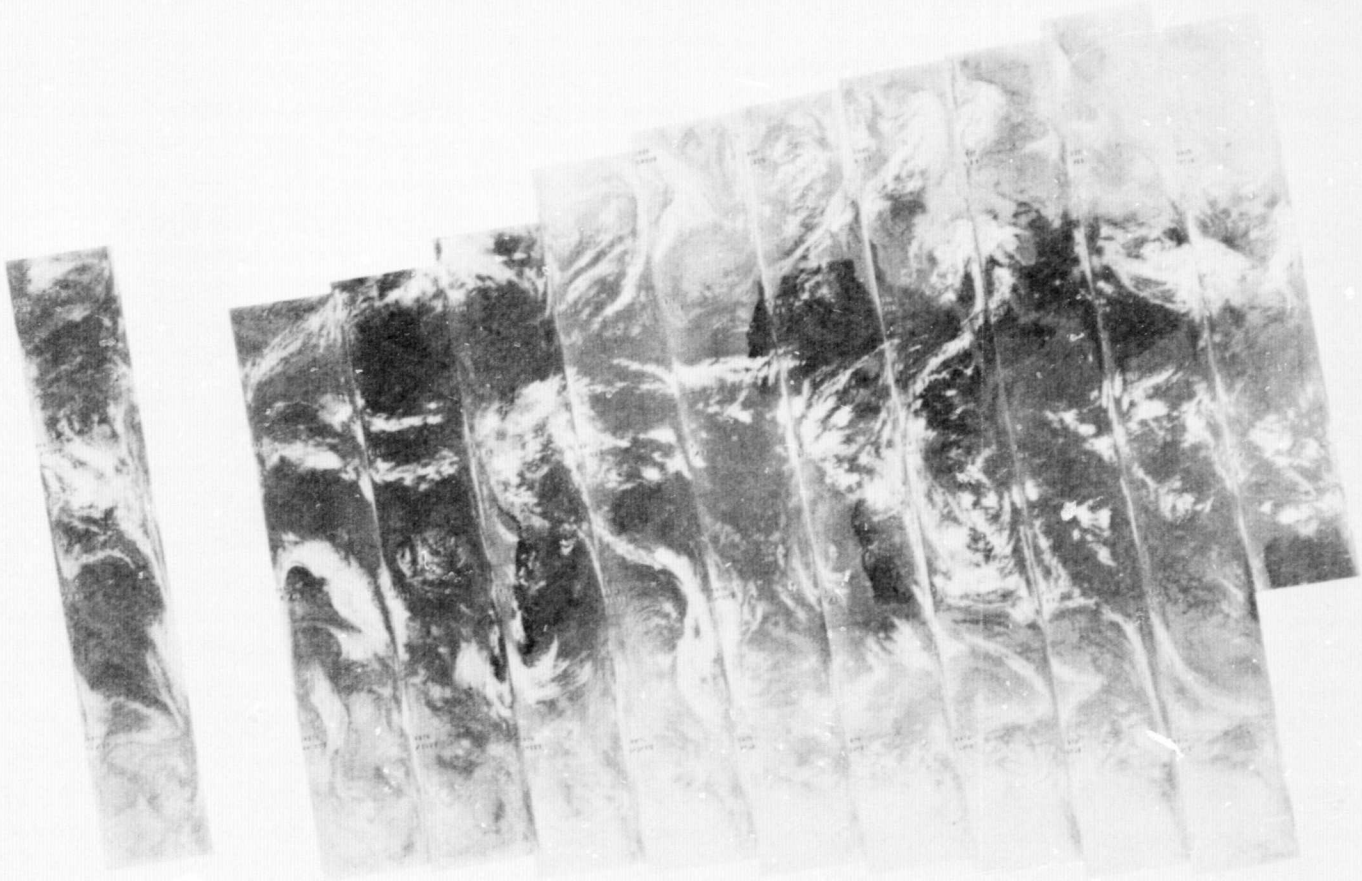
11.5 μm



8637 8636 8635 8634 8633 8632 8631 8630 8629 8628 8627 8626 8625 8624

17 MAR 77

6.7 μm



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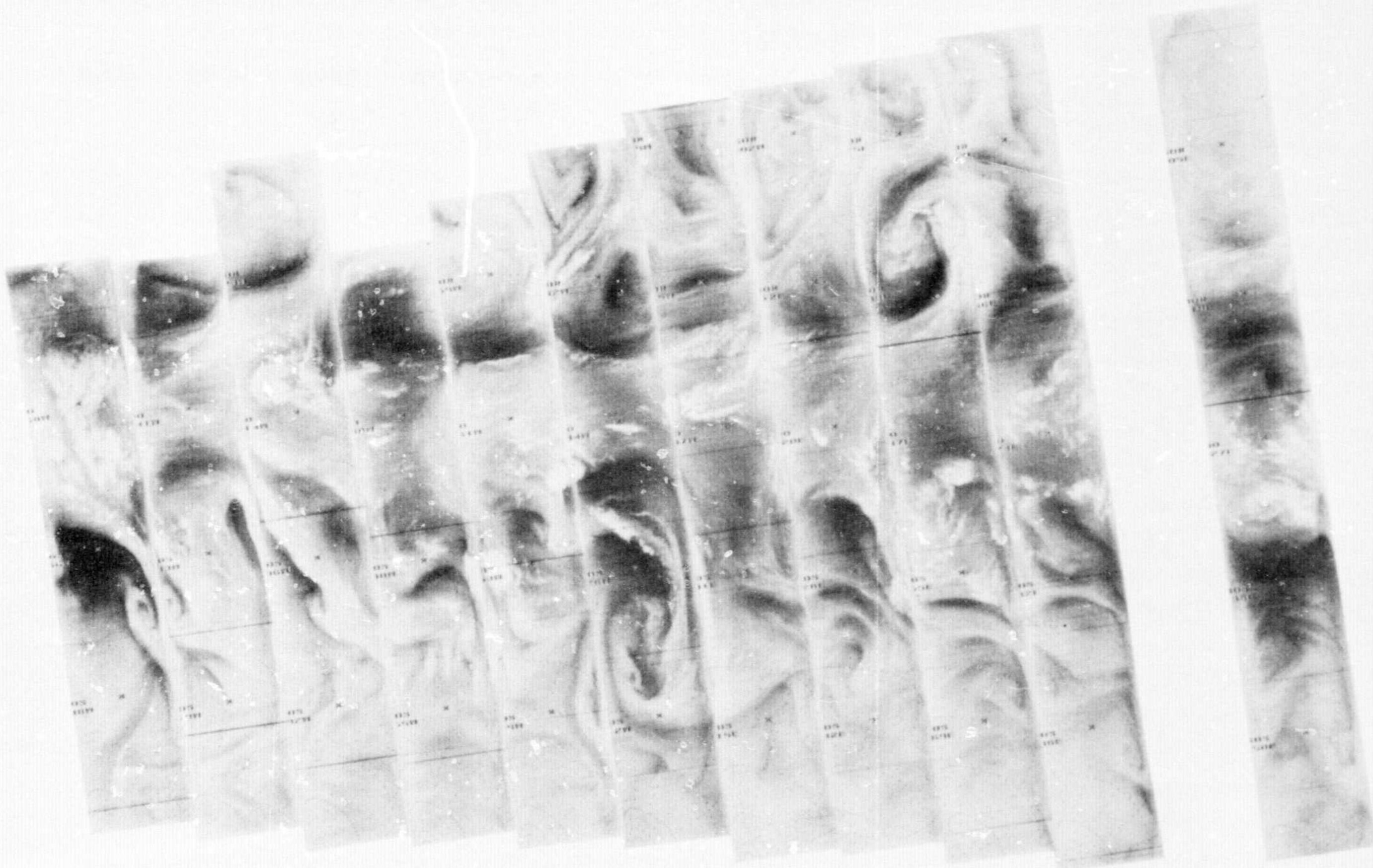
17 MAR 77

11.5 μm



8650 8649 8648 8647 8646 8645 8644 8643 8642 8641 8640 8639 8638

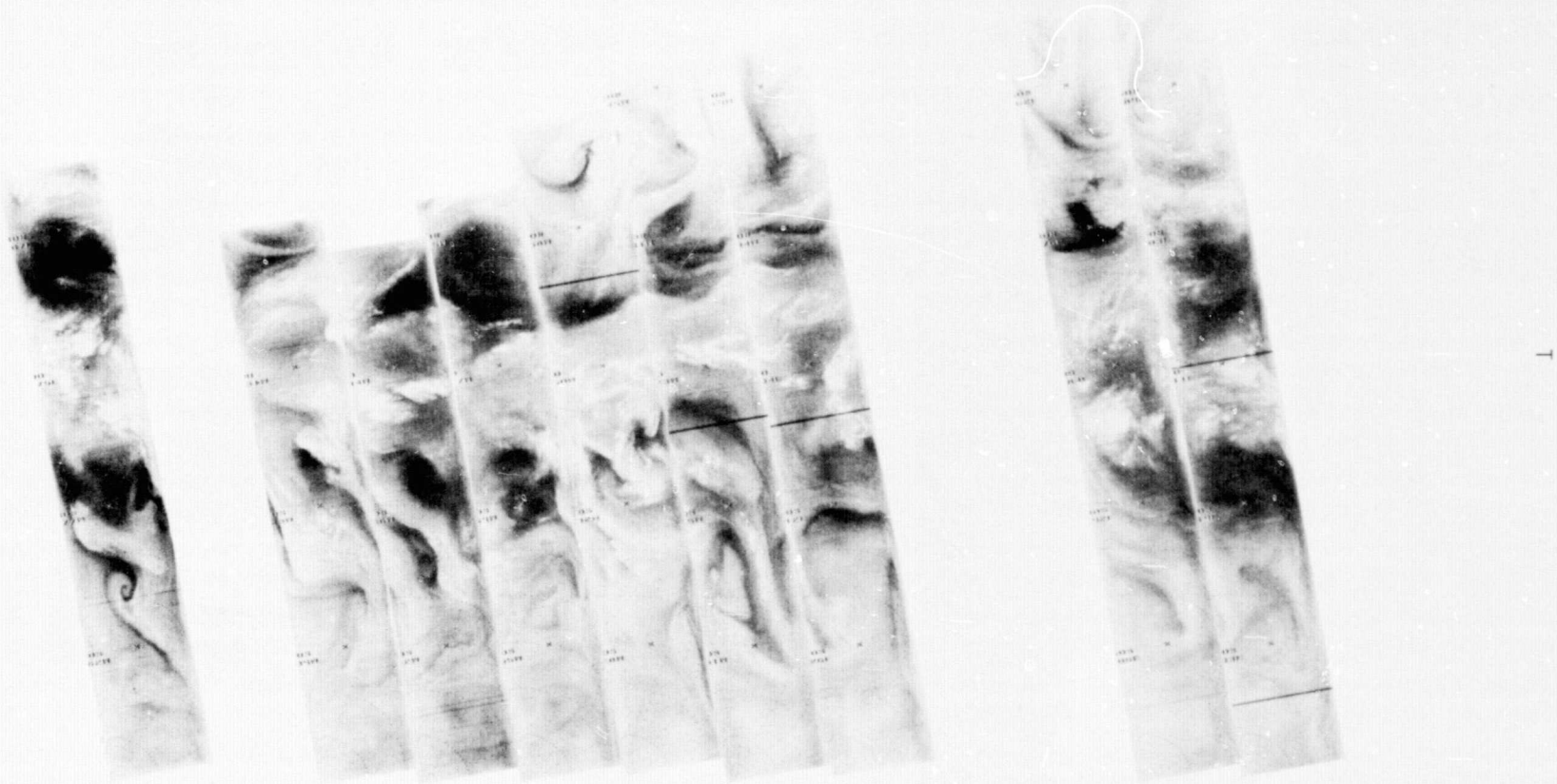
18 MAR 77

6.7 μm

8650 8649 8648 8647 8646 8645 8644 8643 8642 8641 8640 8639 8638

18 MAR 77

11.5 μm



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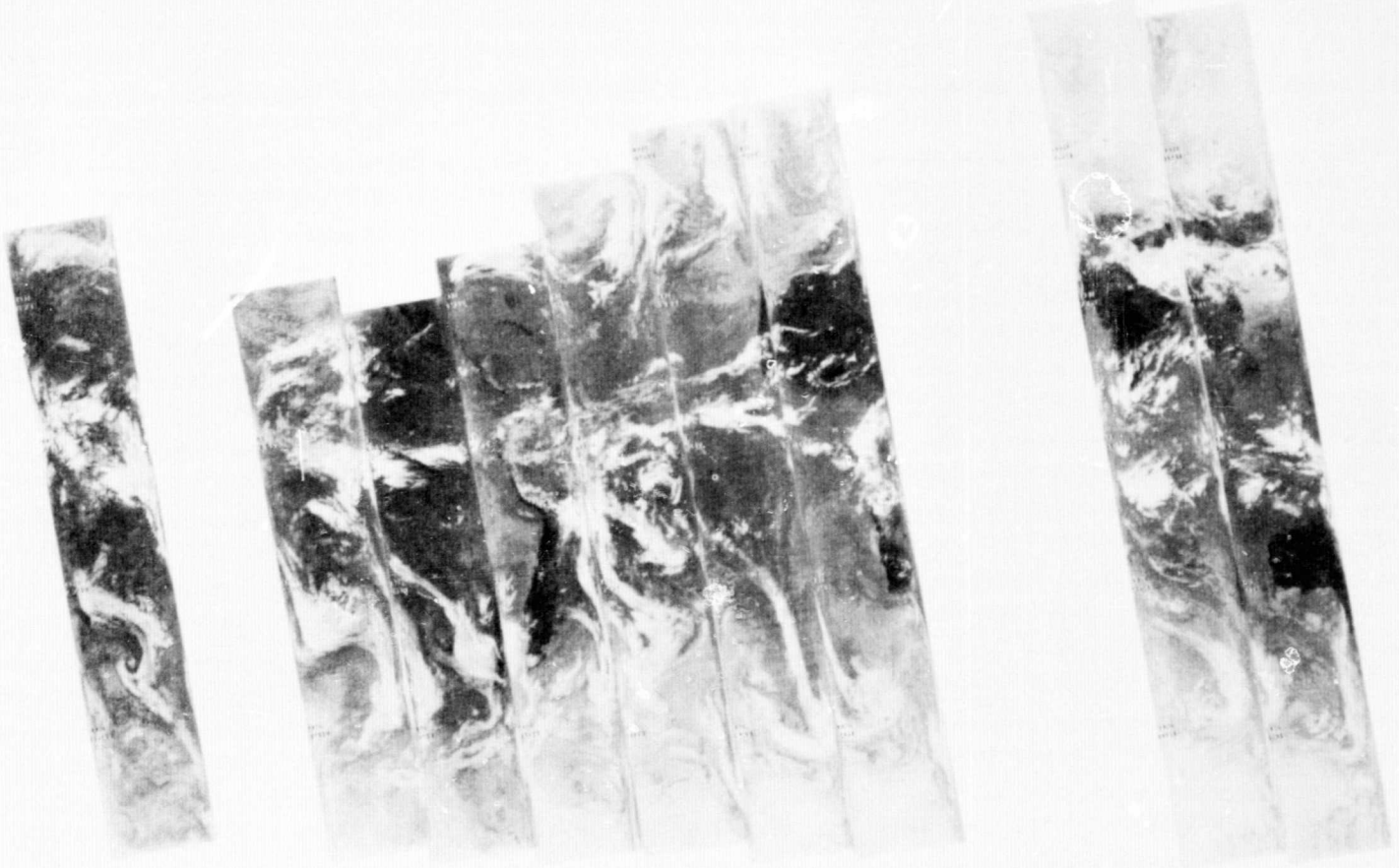
19 MAR 77

6.7 μm



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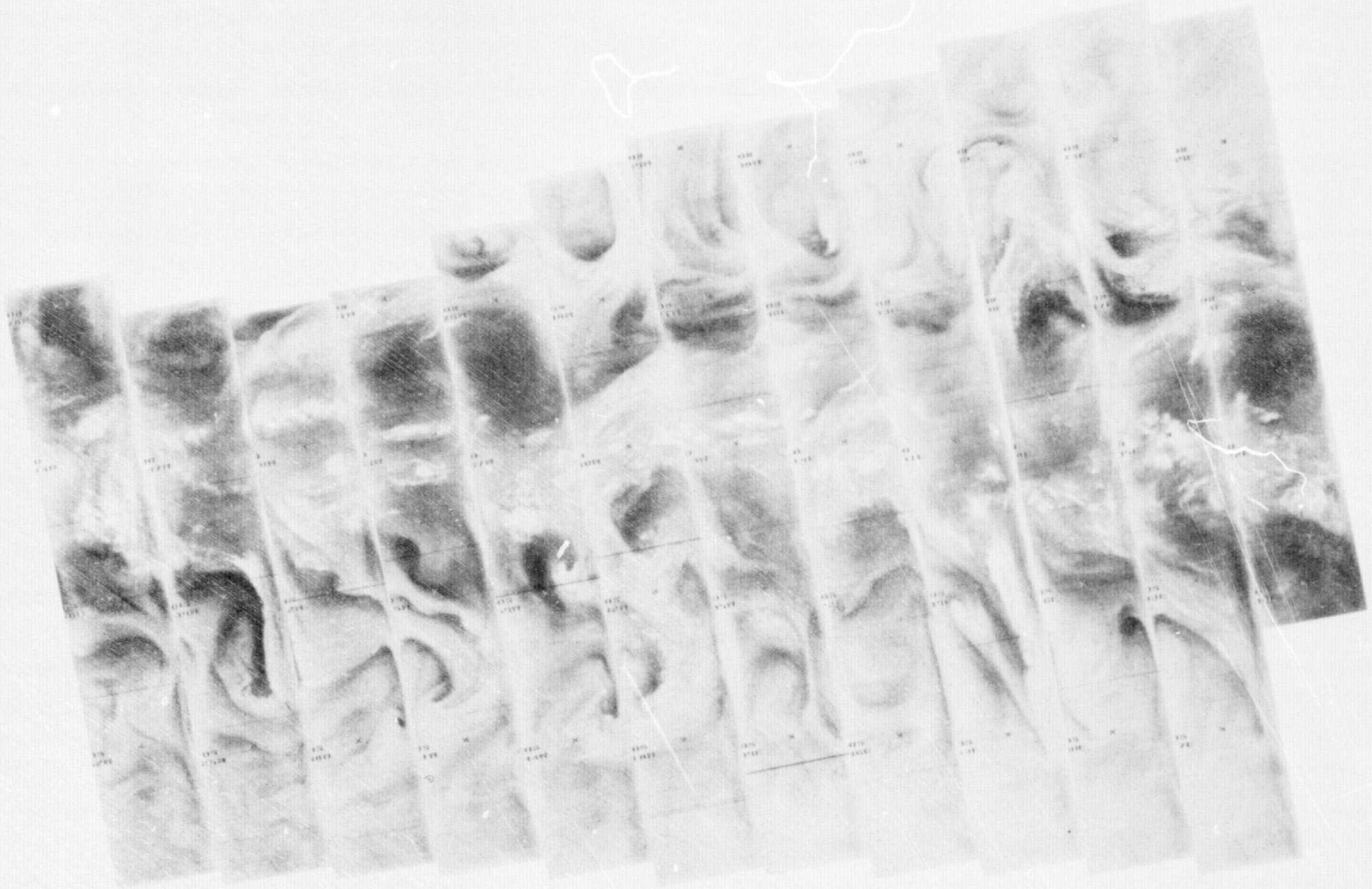
19 MAR 77

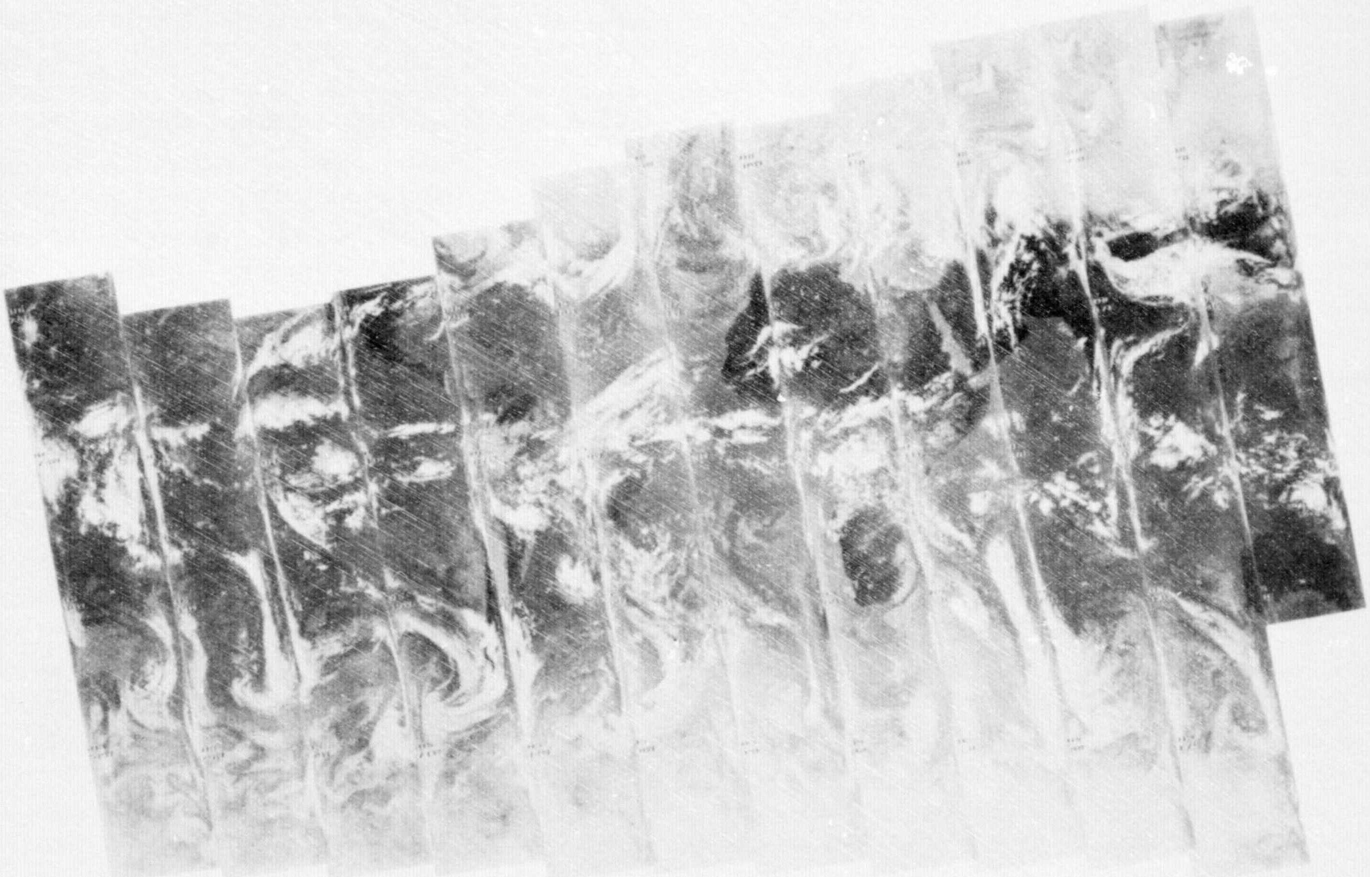
11.5 μm



8677 8676 8675 8674 8673 8672 8671 8670 8669 8668 8667 8666 8665

20 MAR 77

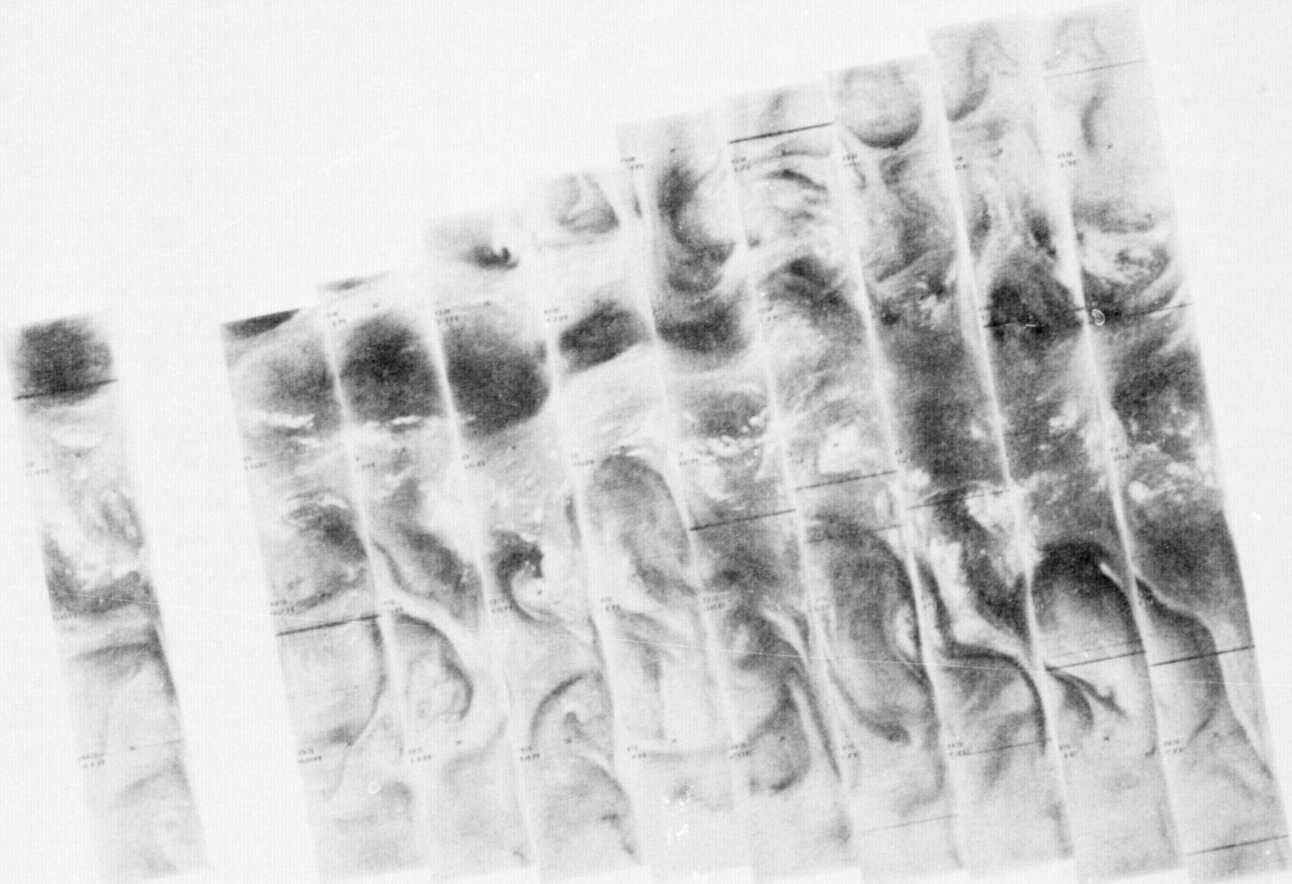
6.7 μm



8677 8676 8675 8674 8673 8672 8671 8670 8669 8668 8667 8666 8665

20 MAR 77

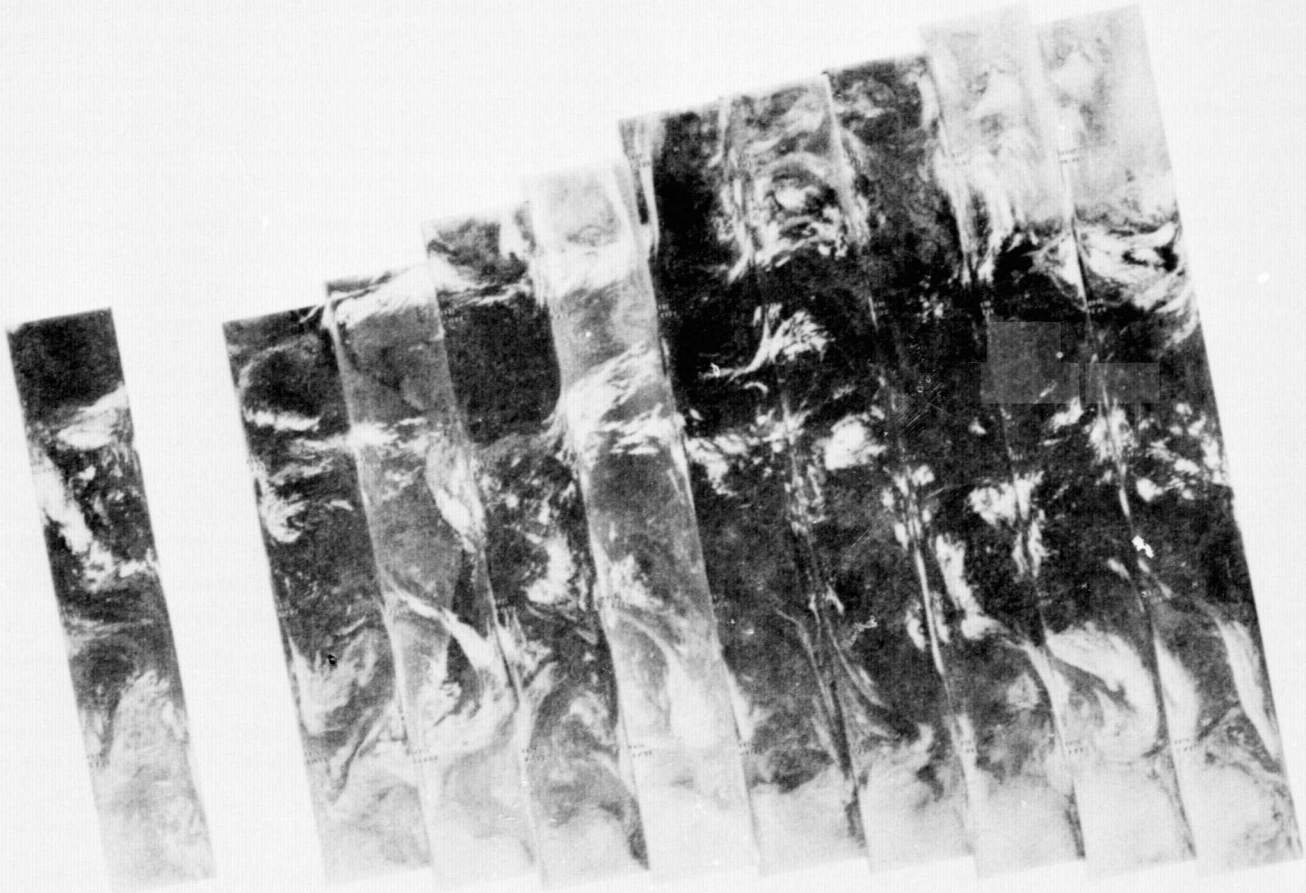
11.5 μm



8690 8689 8688 8687 8686 8685 8684 8683 8682 8681 8680 8679 8678

21 MAR 77

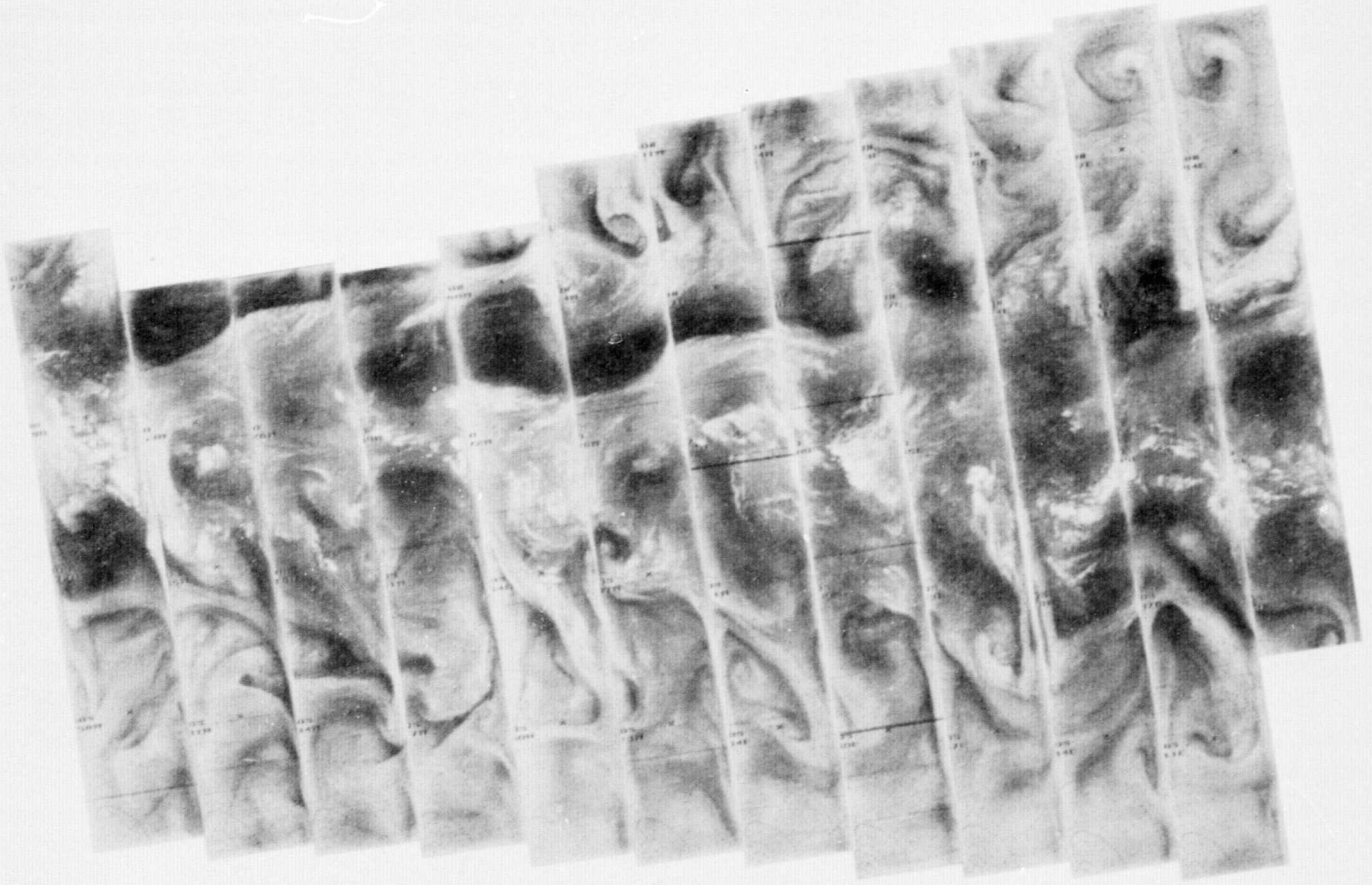
6.7 μm



8690 8689 8688 8687 8686 8685 8684 8683 8682 8681 8680 8679 8678

21 MAR 77

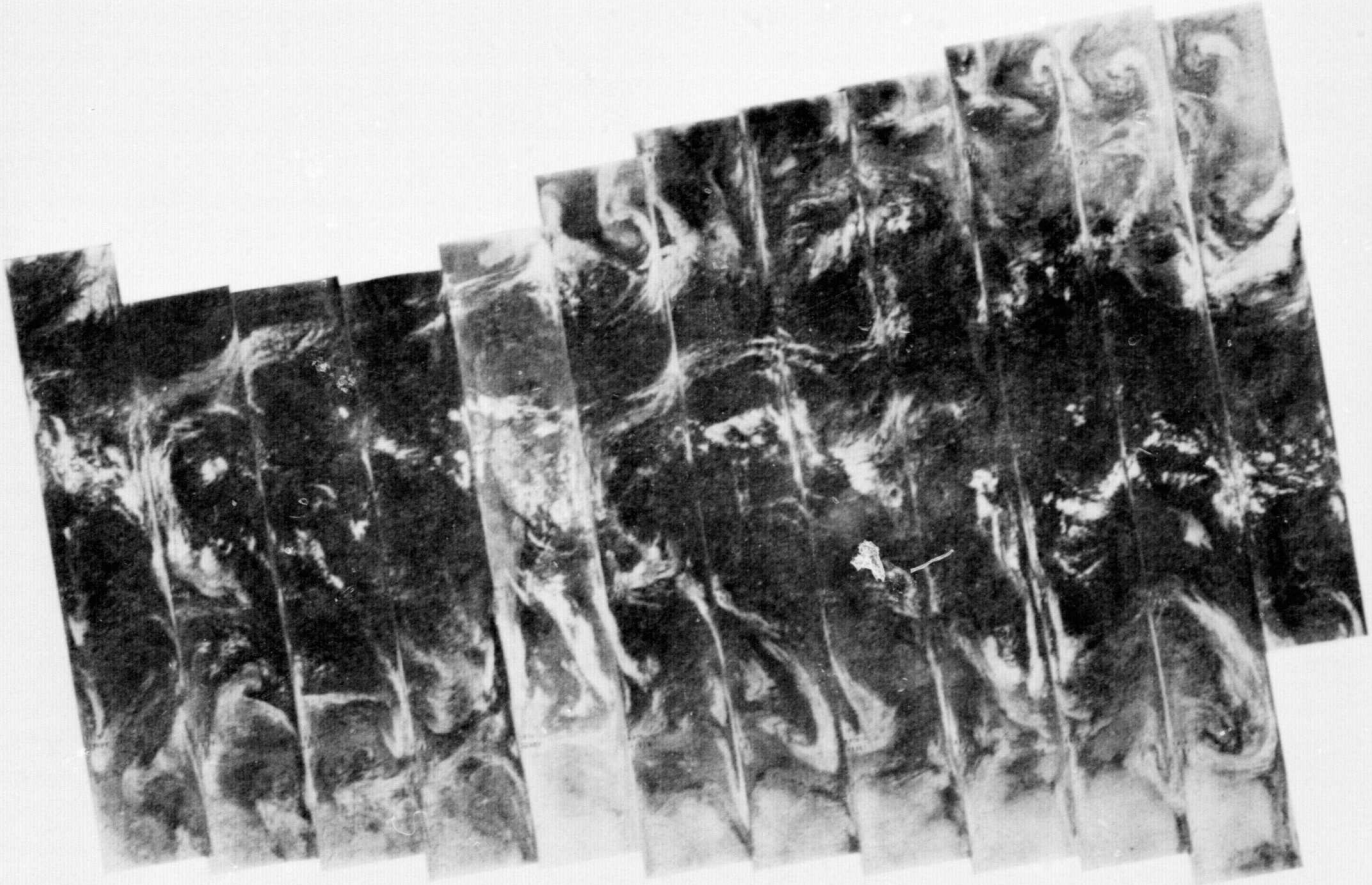
11.5 μm



8704 8703 8702 8701 8700 8699 8698 8697 8696 8695 8694 8693 8692 8691

22 MAR 77

6.7 μm



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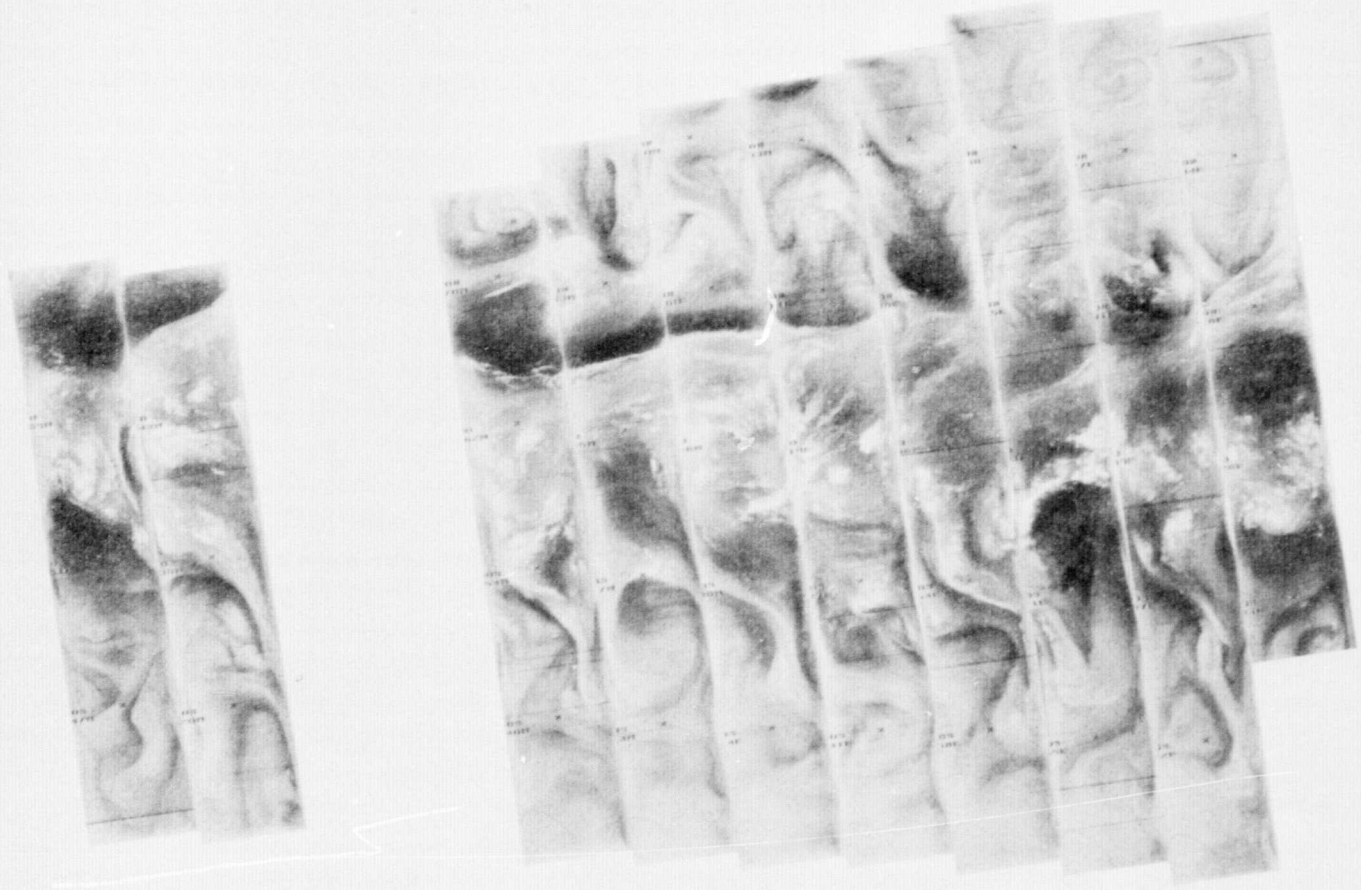
22 MAR 77

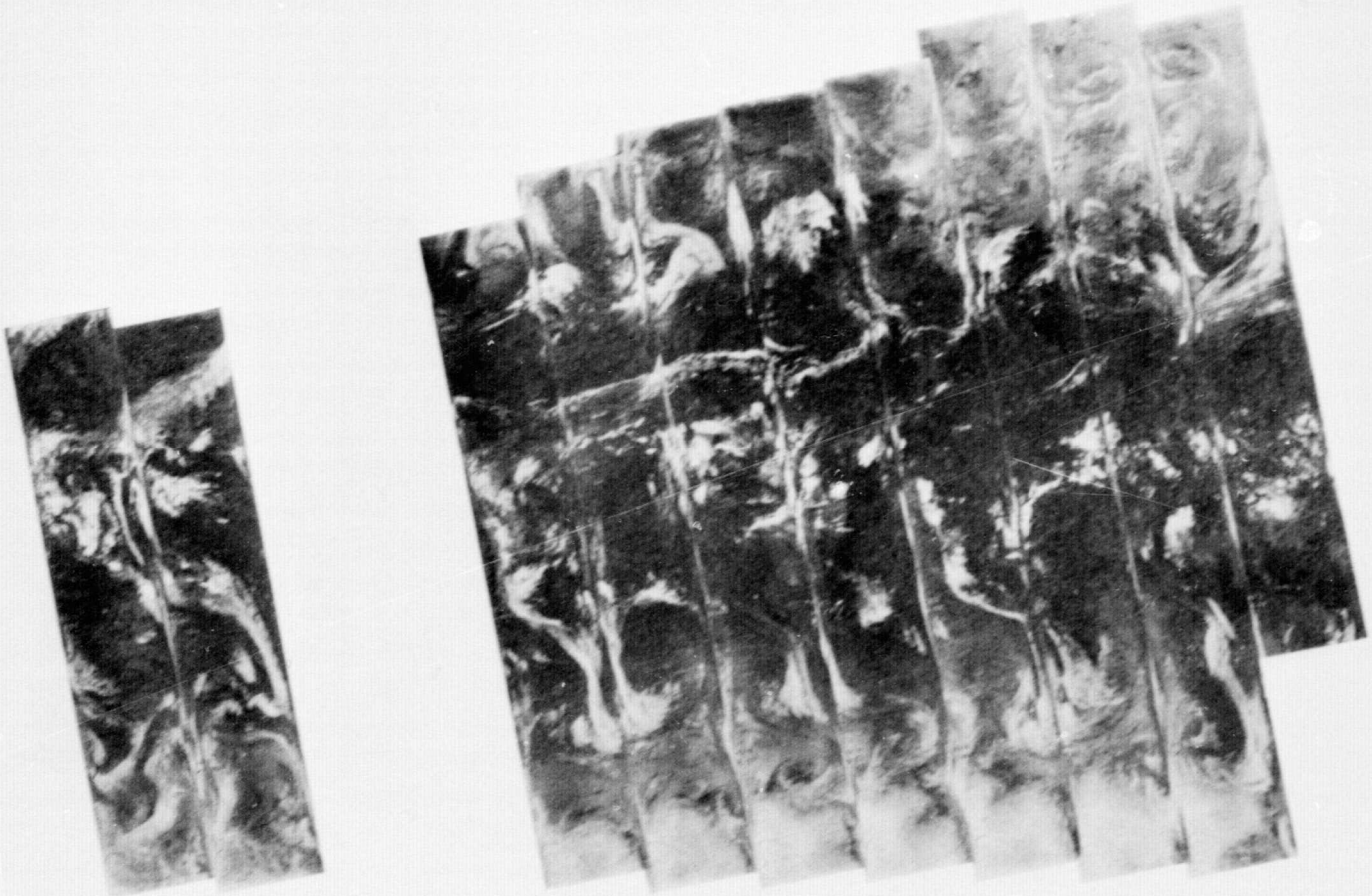
11.5 μm



8717 8716 8715 8714 8713 8712 8711 8710 8709 8708 8707 8706 8705

23 MAR 77

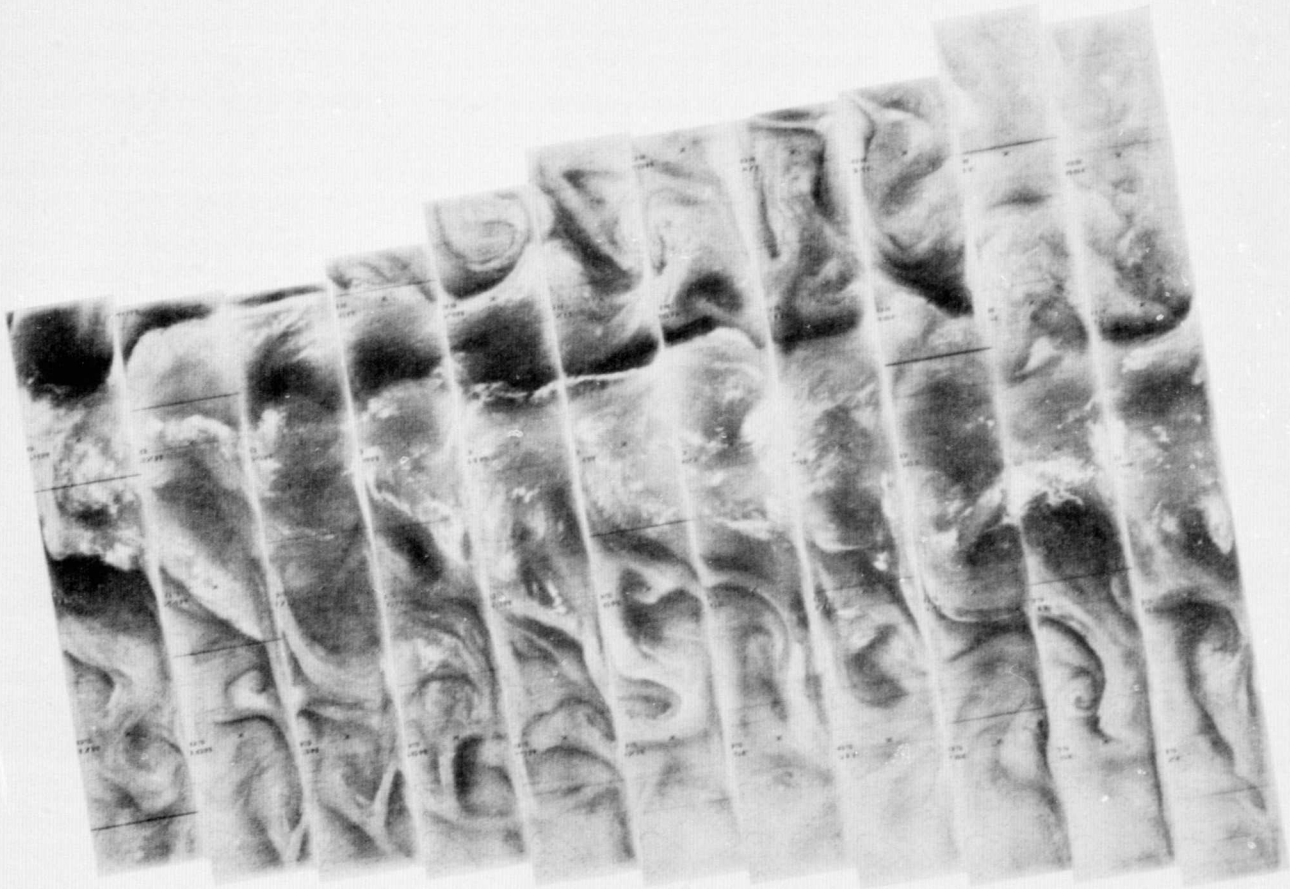
6.7 μm



8717 8716 8715 8714 8713 8712 8711 8710 8709 8708 8707 8706 8705

23 MAR 77

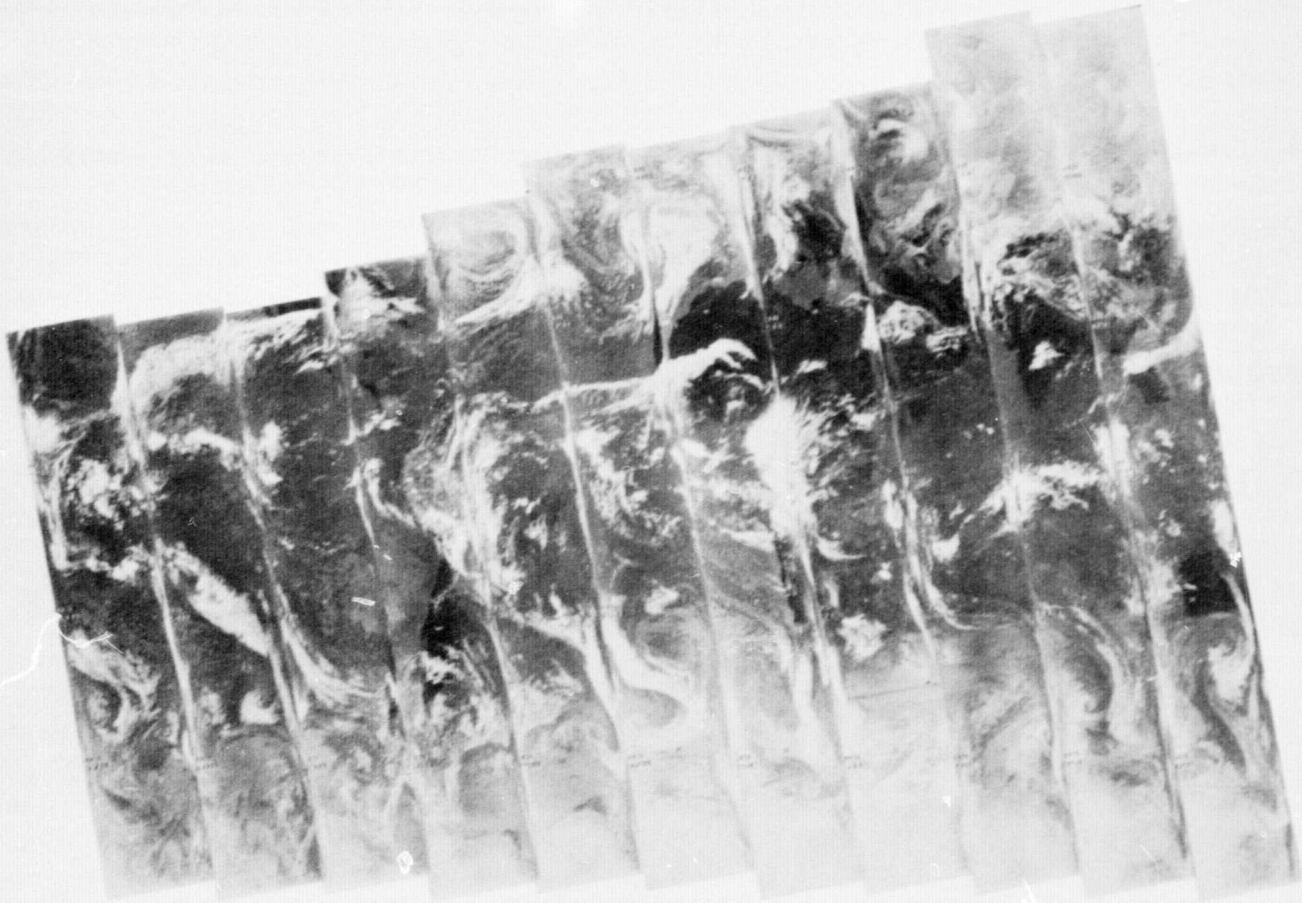
11.5 μm



8730 8729 8728 8727 8726 8725 8724 8723 8722 8721 8720 8719 8718

24 MAR 77

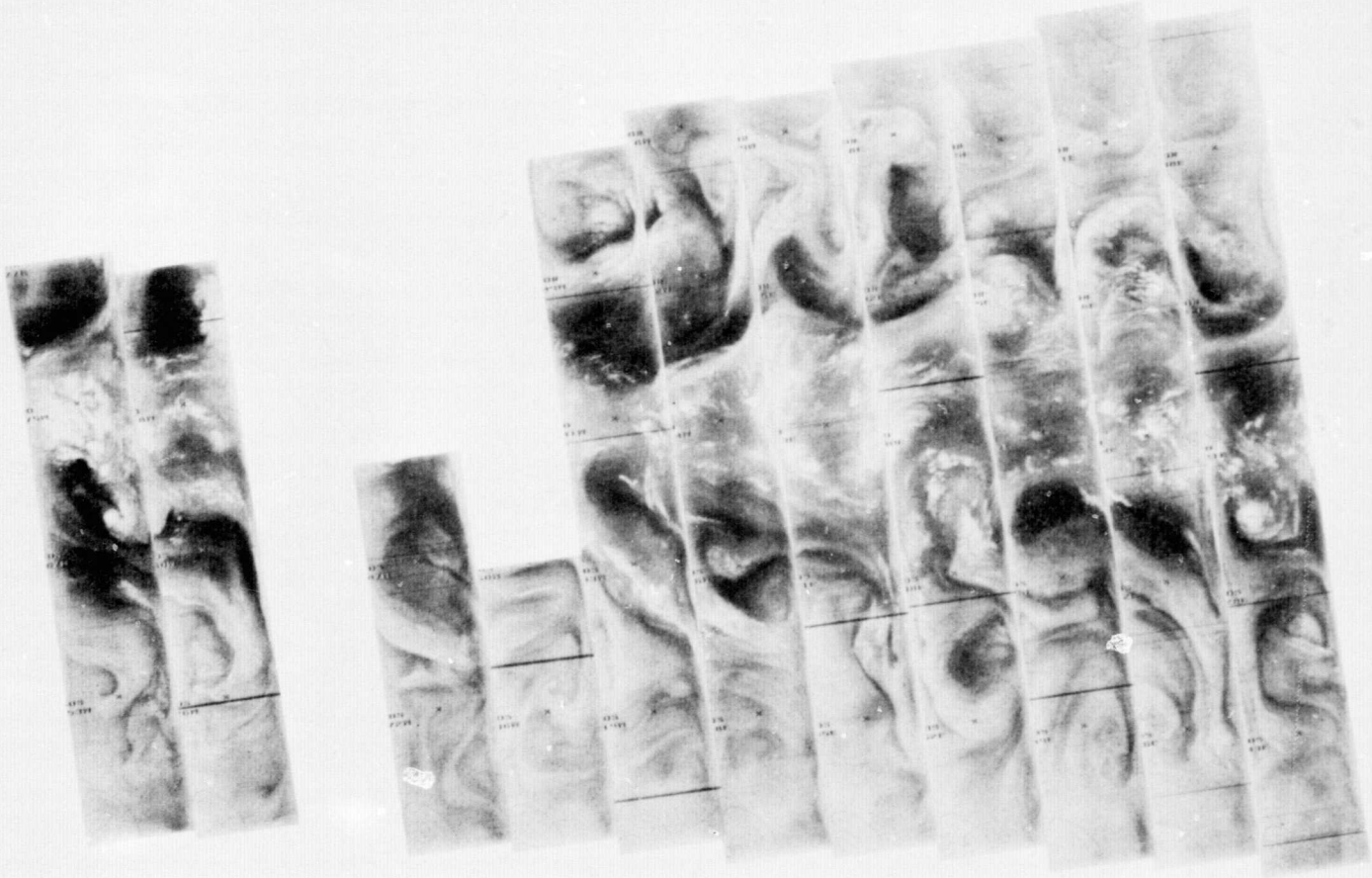
6.7 μm



8730 8729 8728 8727 8726 8725 8724 8723 8722 8721 8720 8719 8718

24 MAR 77

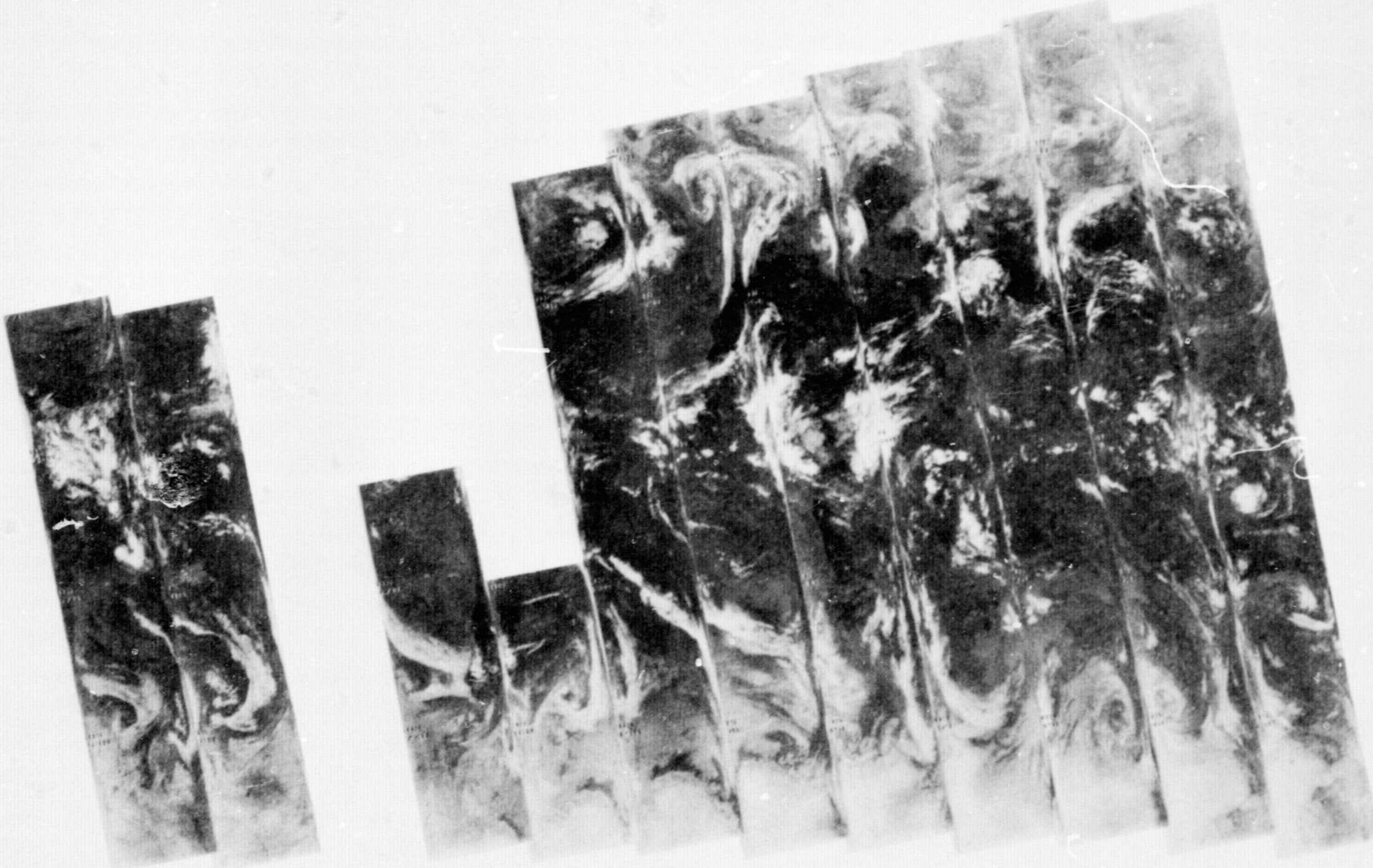
11.5 μm



8744 8743 8742 8741 8740 8739 8738 8737 8736 8735 8734 8733 8732 8731

25 MAR 77

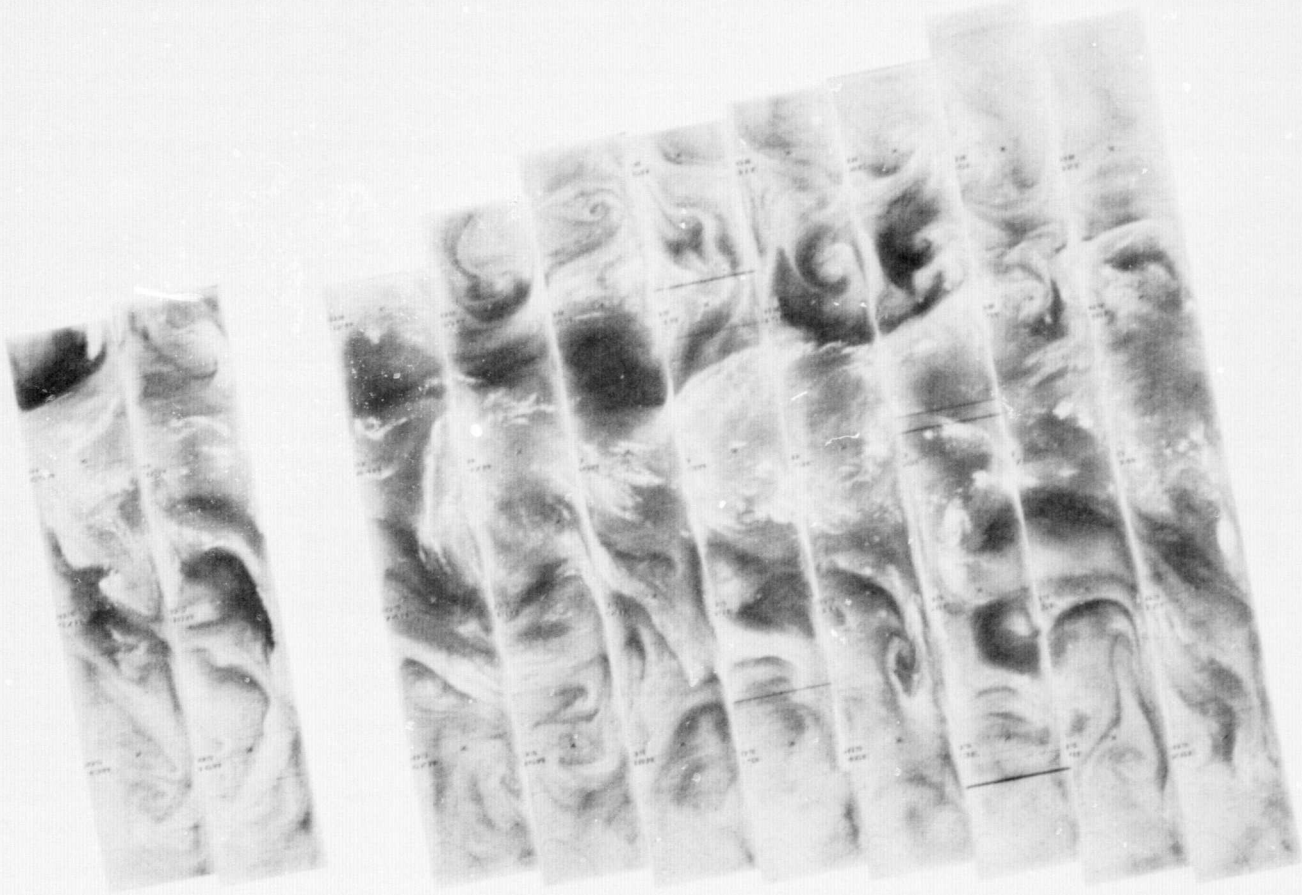
6.7 μm



8744 8743 8742 8741 8740 8739 8738 8737 8736 8735 8734 8733 8732 8731

25 MAR 77

11.5 μm



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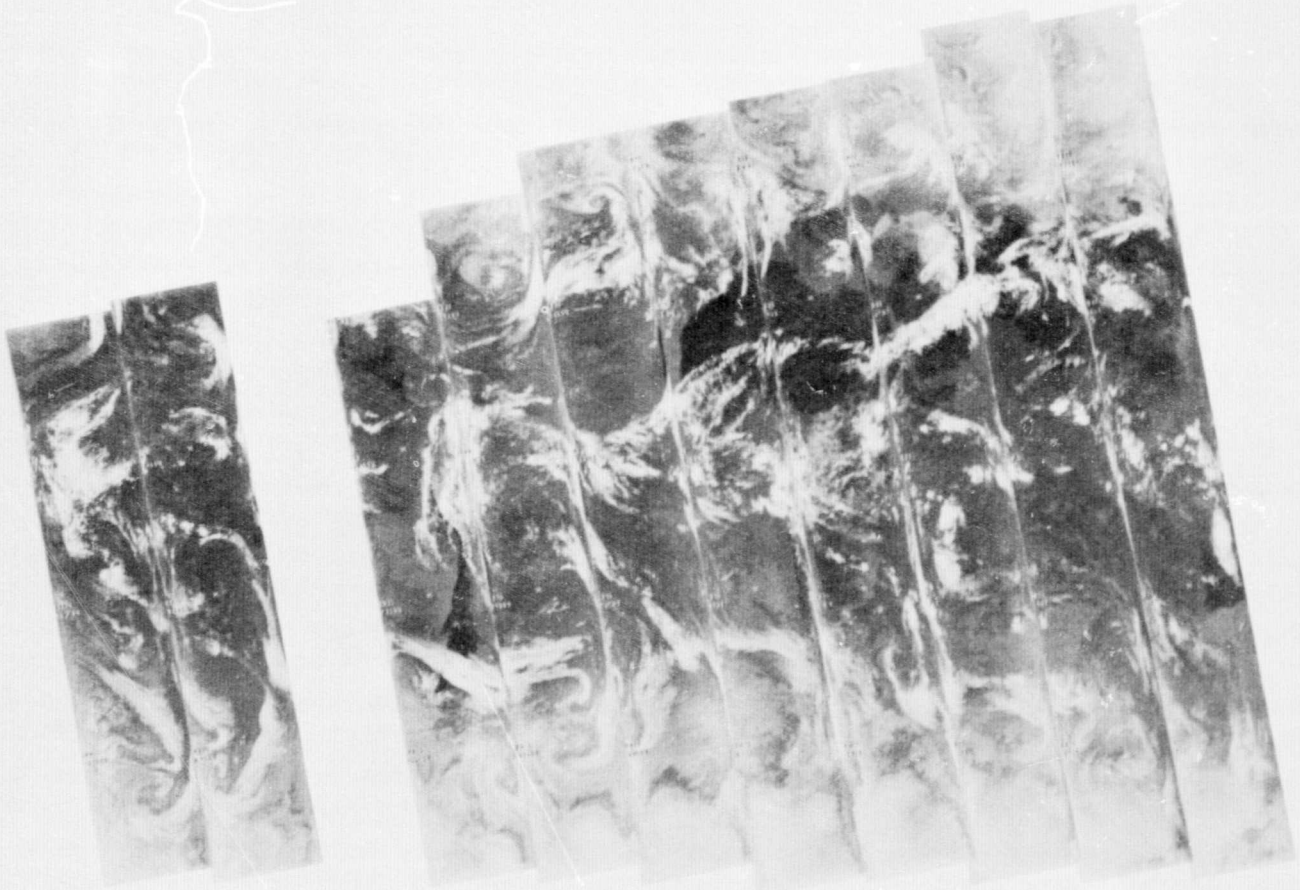
26 MAR 77

6.7 μm



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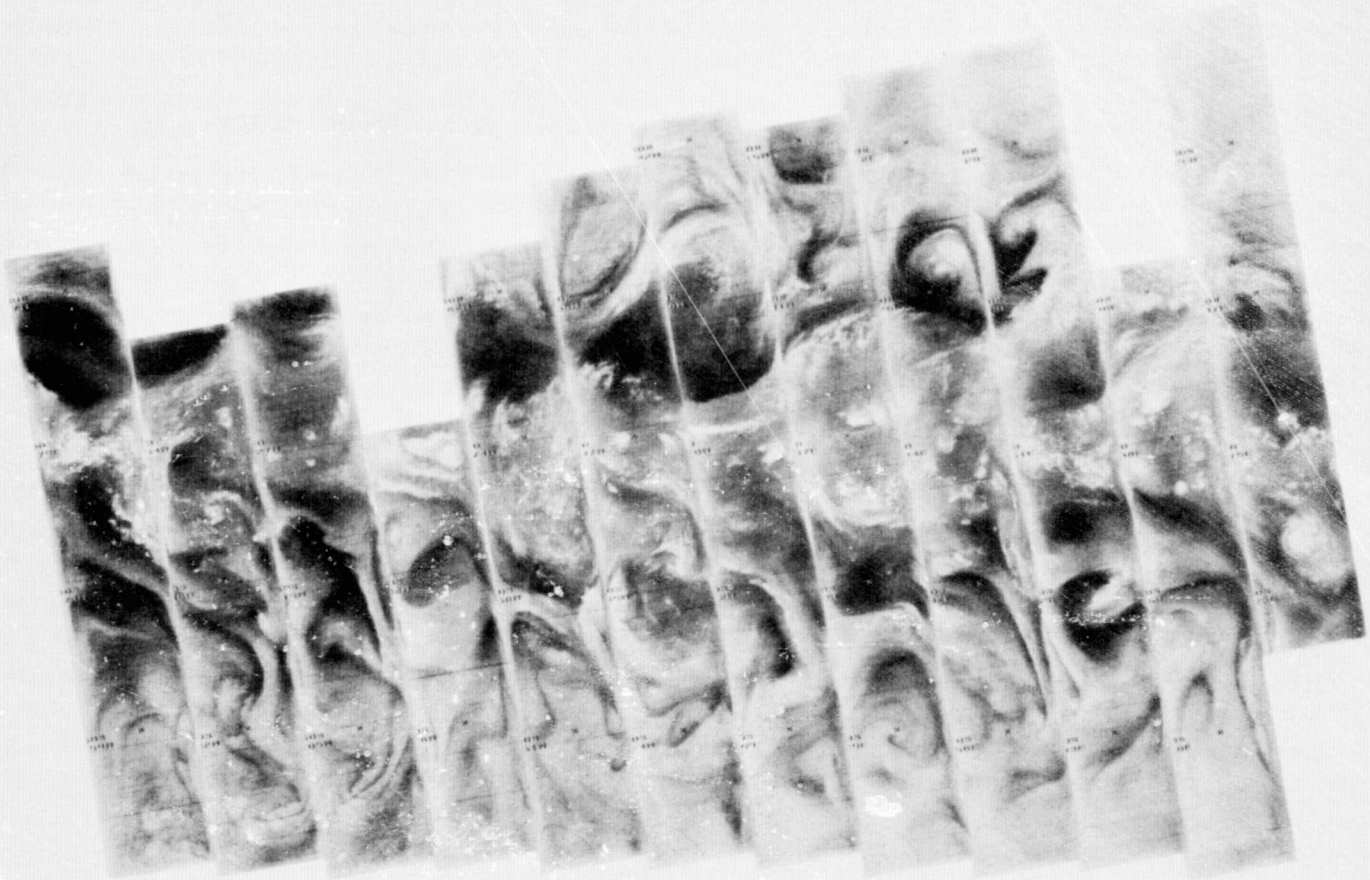
26 MAR 77

11.5 μm



8771 8770 8769 8768 8767 8766 8765 8764 8763 8762 8761 8760 8759 8758

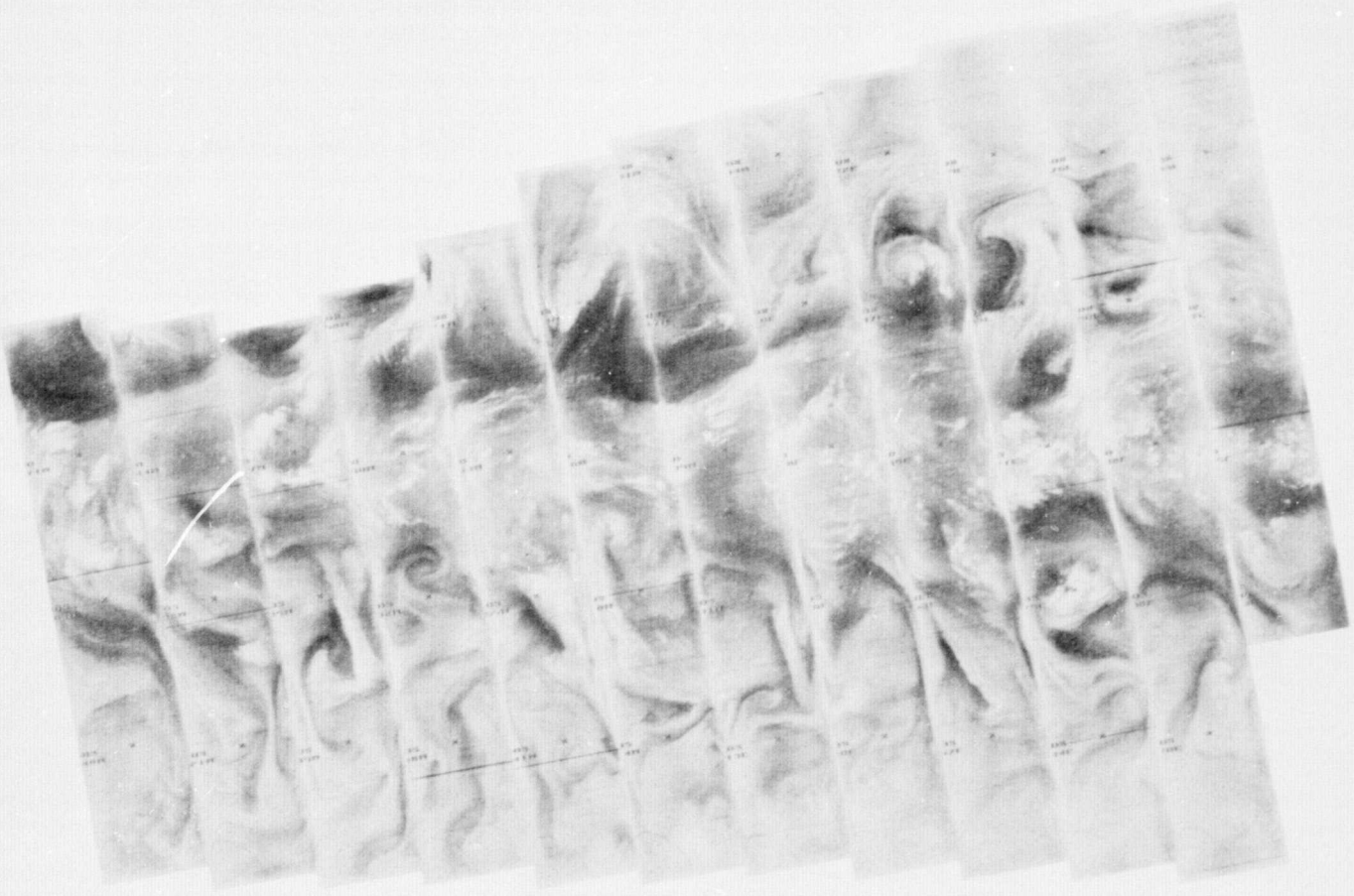
27 MAR 77

6.7 μm

8771 8770 8769 8768 8767 8766 8765 8764 8763 8762 8761 8760 8759 8758

27 MAR 77

11.5 μm



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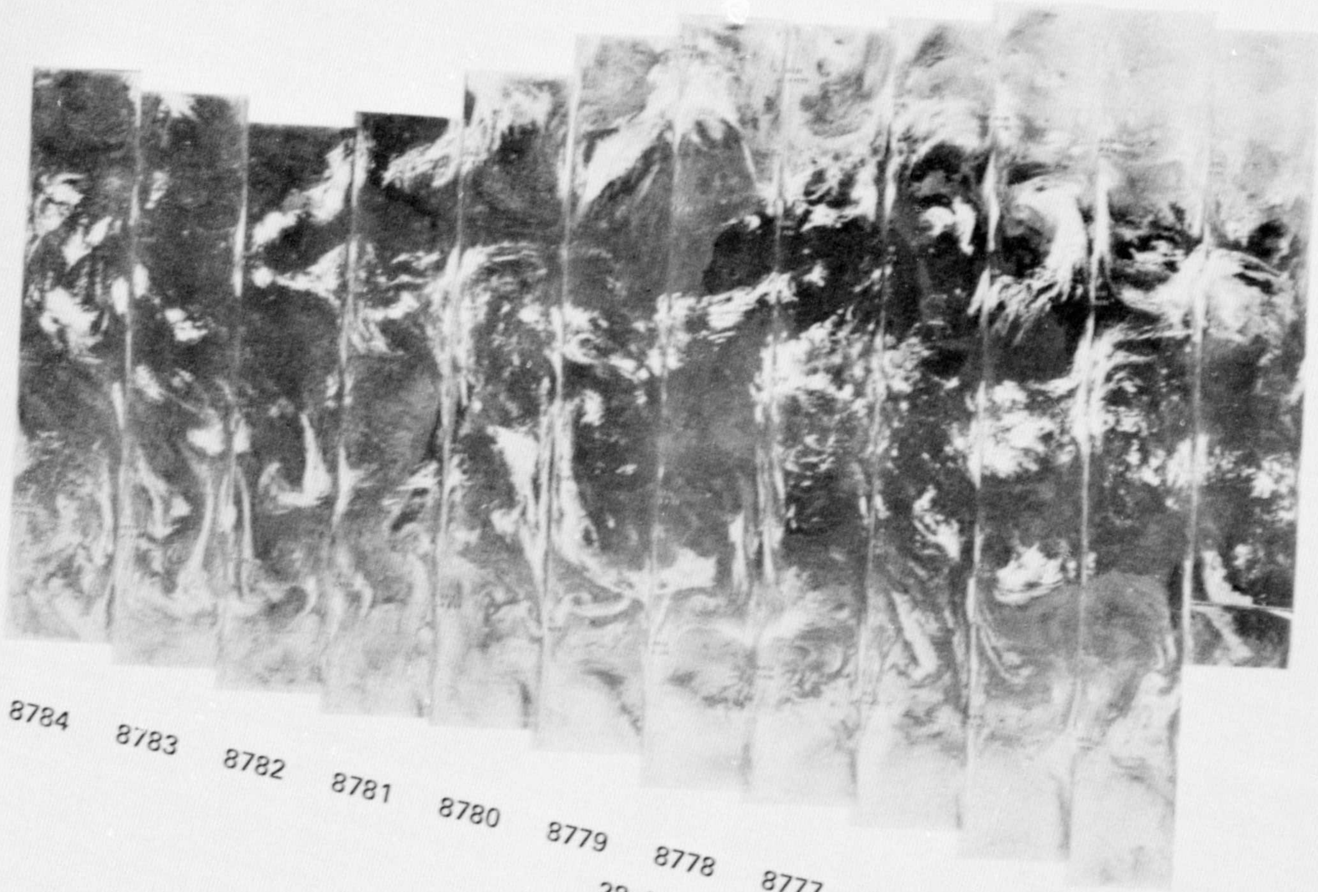
28 MAR 77

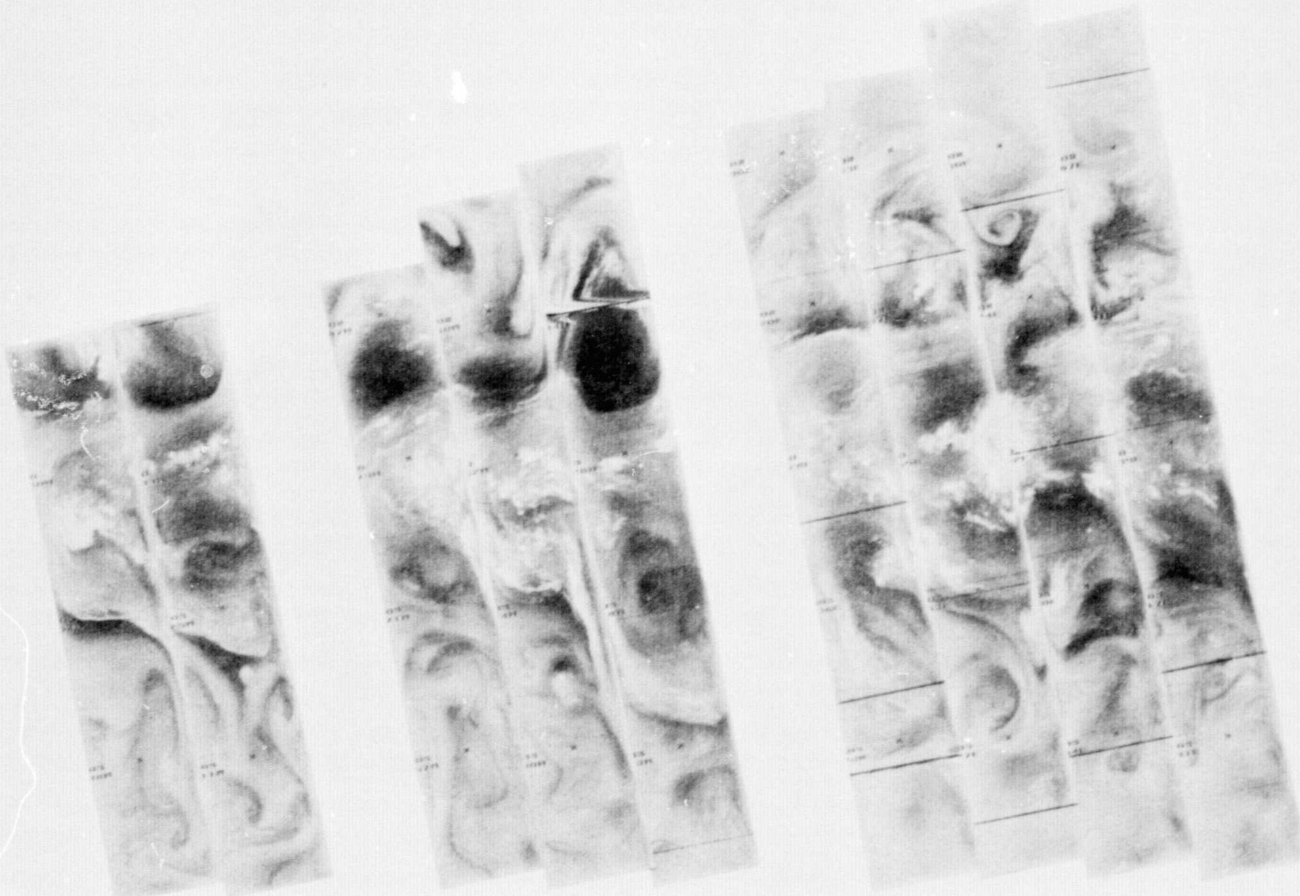
6.7 μm



8784 8783 8782 8781 8780 8779 8778 8777 8776 8775 8774 8773 8772

28 MAR 77

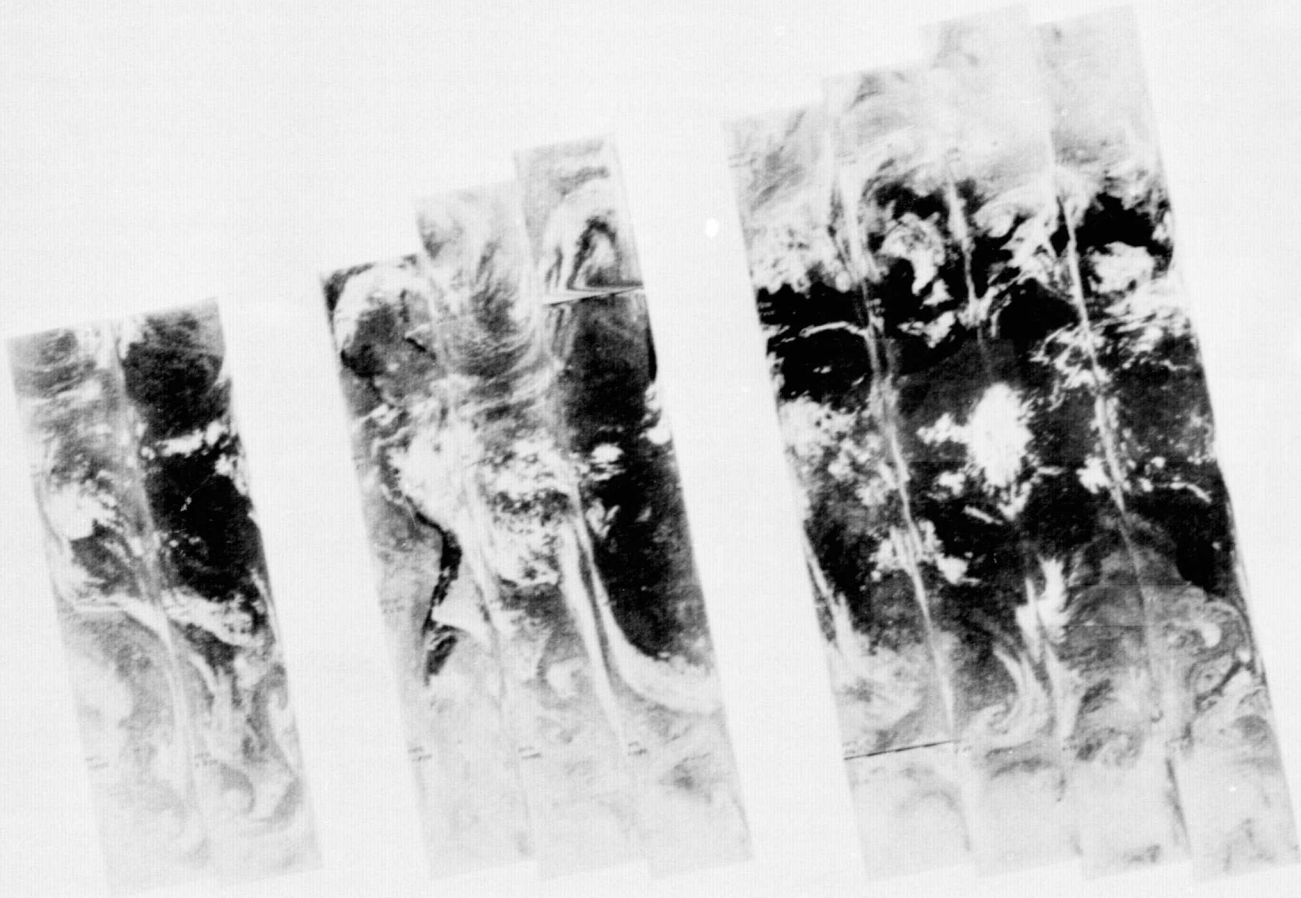
11.5 μm



8797 8796 8795 8794 8793 8792 8791 8790 8789 8788 8787 8786 8785

29 MAR 77

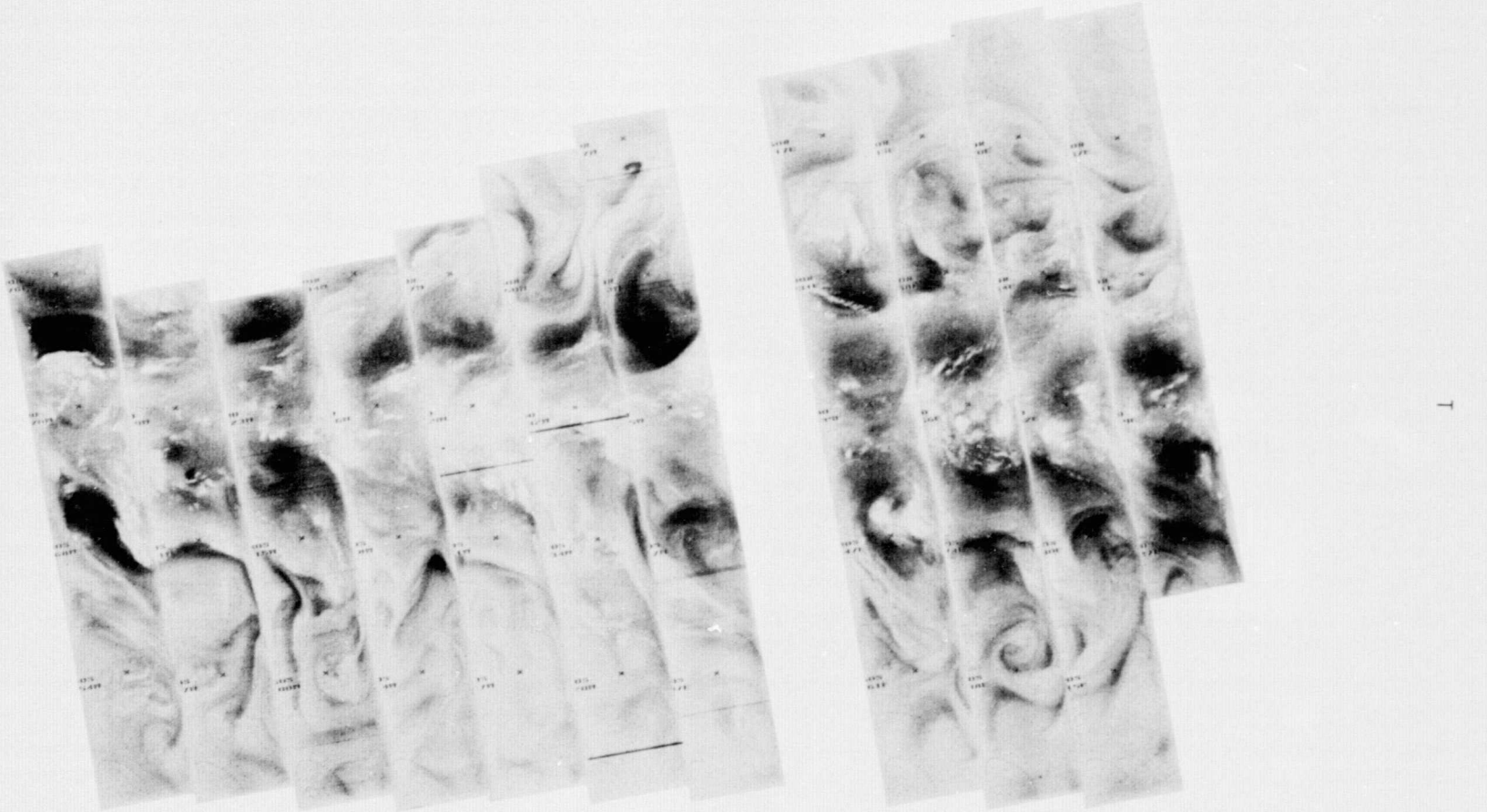
6.7 μm



8797 8796 8795 8794 8793 8792 8791 8790 8789 8788 8787 8786 8785

29 MAR 77

11.5 μm



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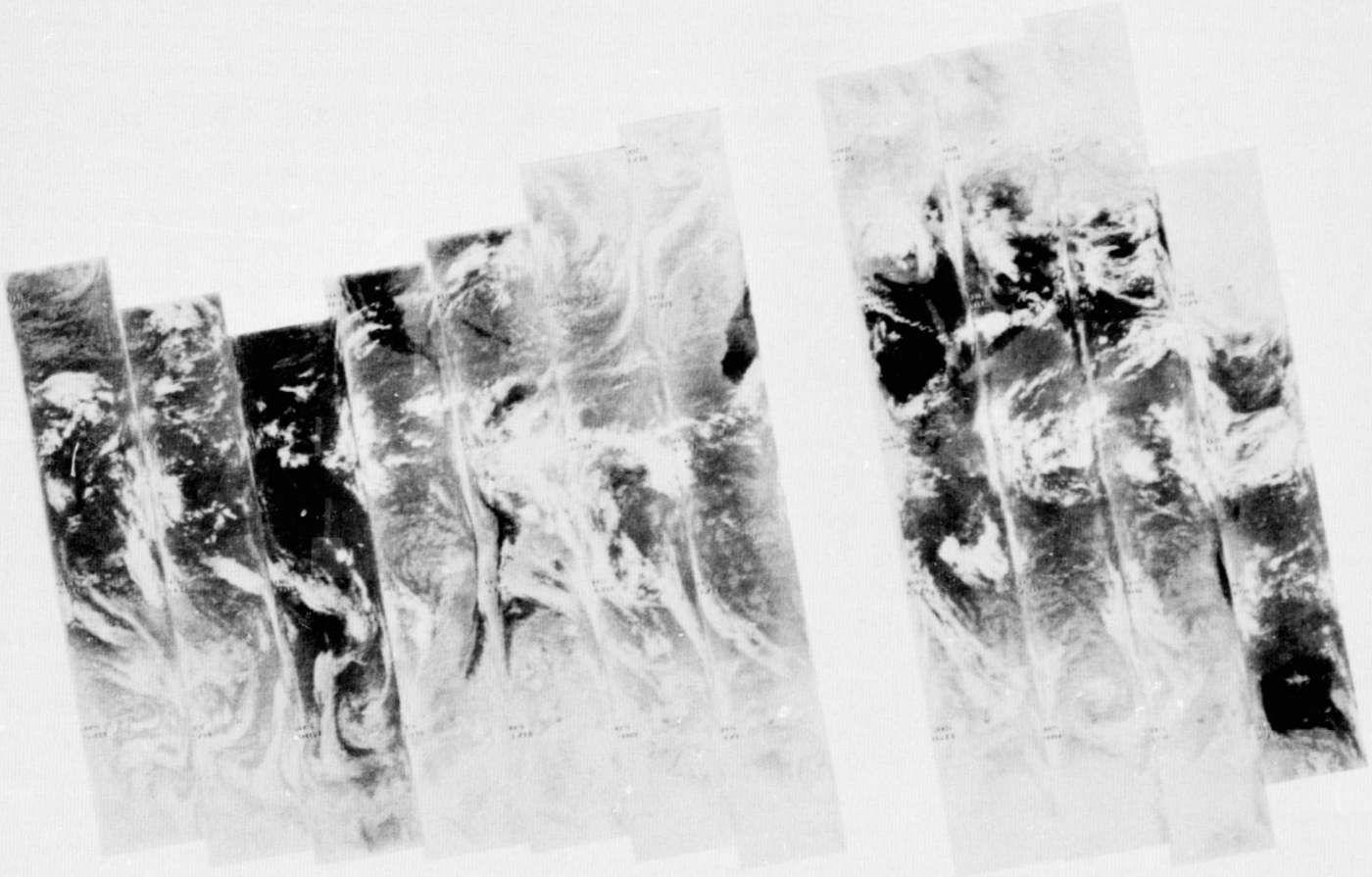
30 MAR 77

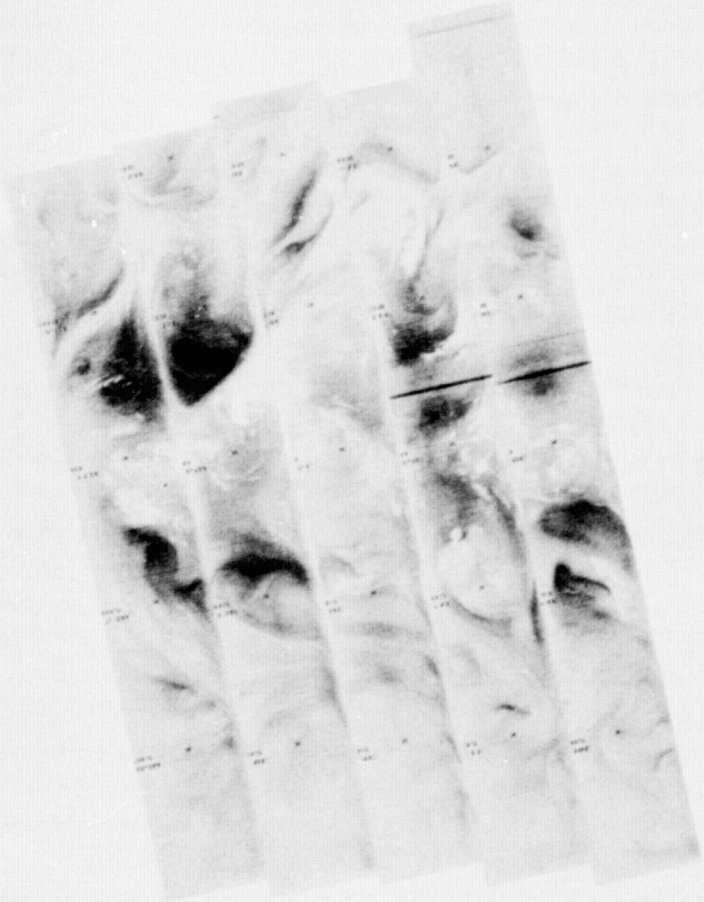
6.7 μm



8811 8810 8809 8808 8807 8806 8805 8804 8803 8802 8801 8800 8799 8798

30 MAR 77

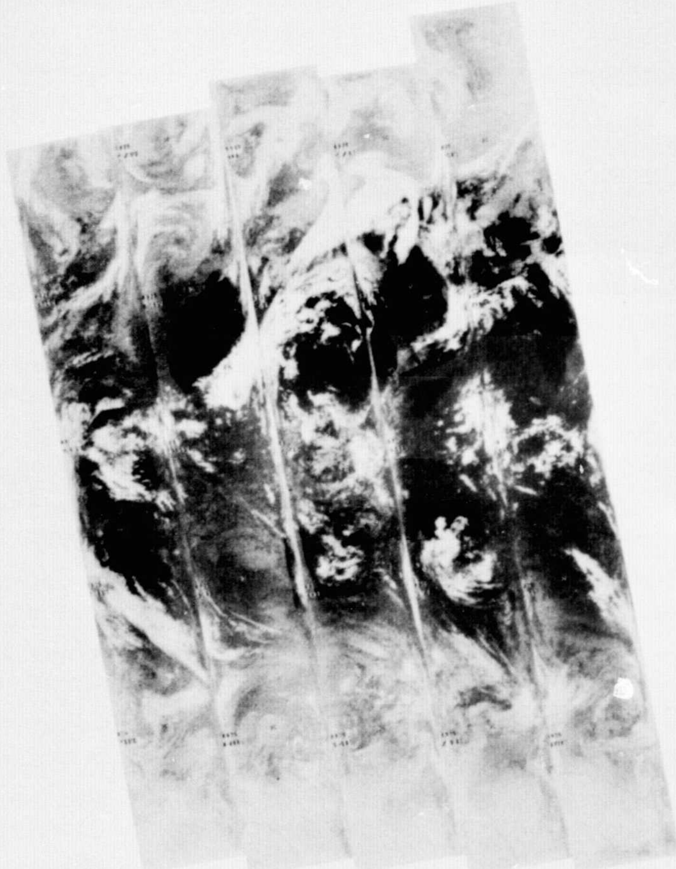
11.5 μm



8824 8823 8822 8821 8820 8819 8818 8817 8816 8815 8814 8813 8812

31 MAR 77

6.7 μm



8824 8823 8822 8821 8820 8819 8818 8817 8816 8815 8814 8813 8812

31 MAR 77

11.5 μm

9092 9091 9090 9089 9088 9087 9086 9085 9084 9083 9082 9081 9080

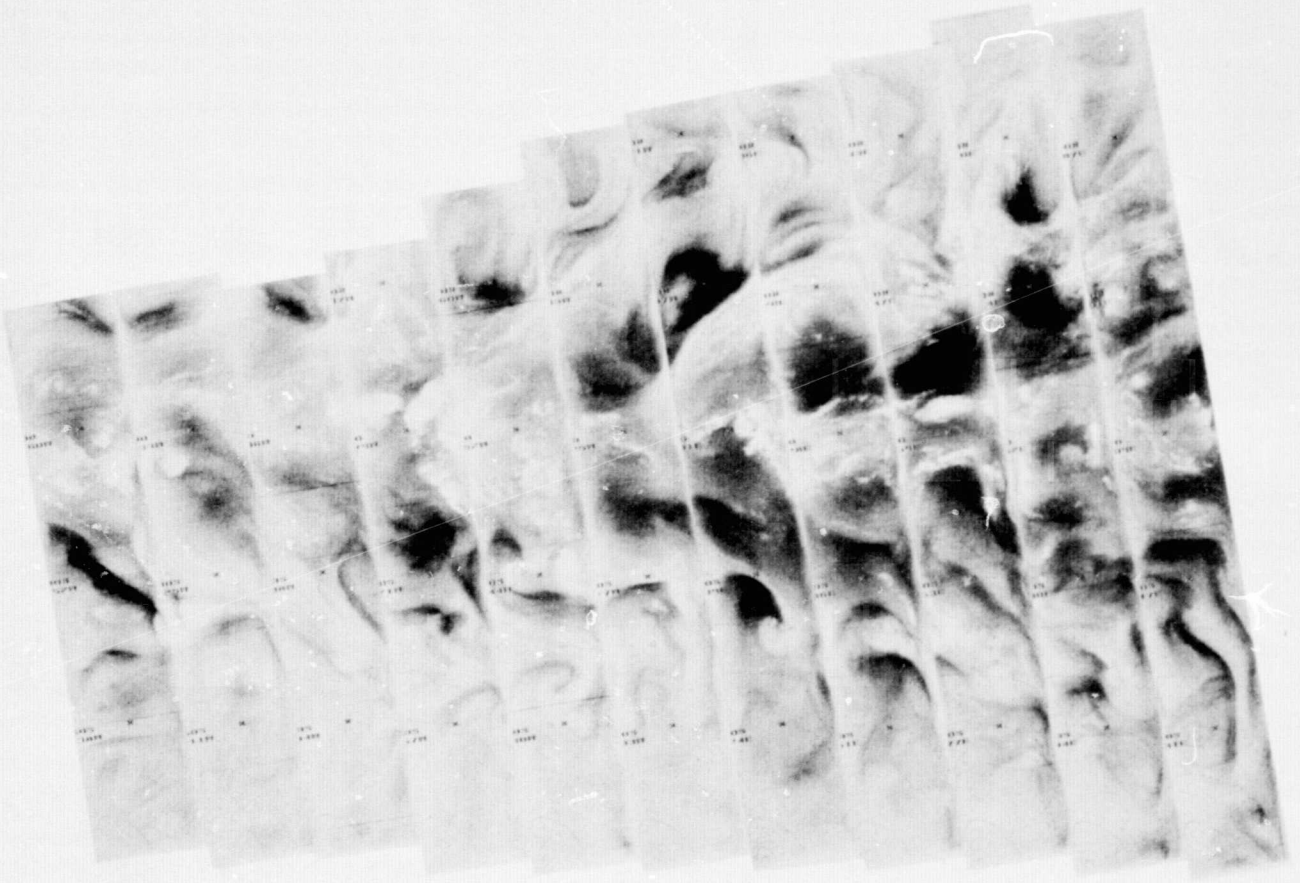
20 APR 77

6.7 μm

9092 9091 9090 9089 9088 9087 9086 9085 9084 9083 9082 9081 9080

20 APR 77

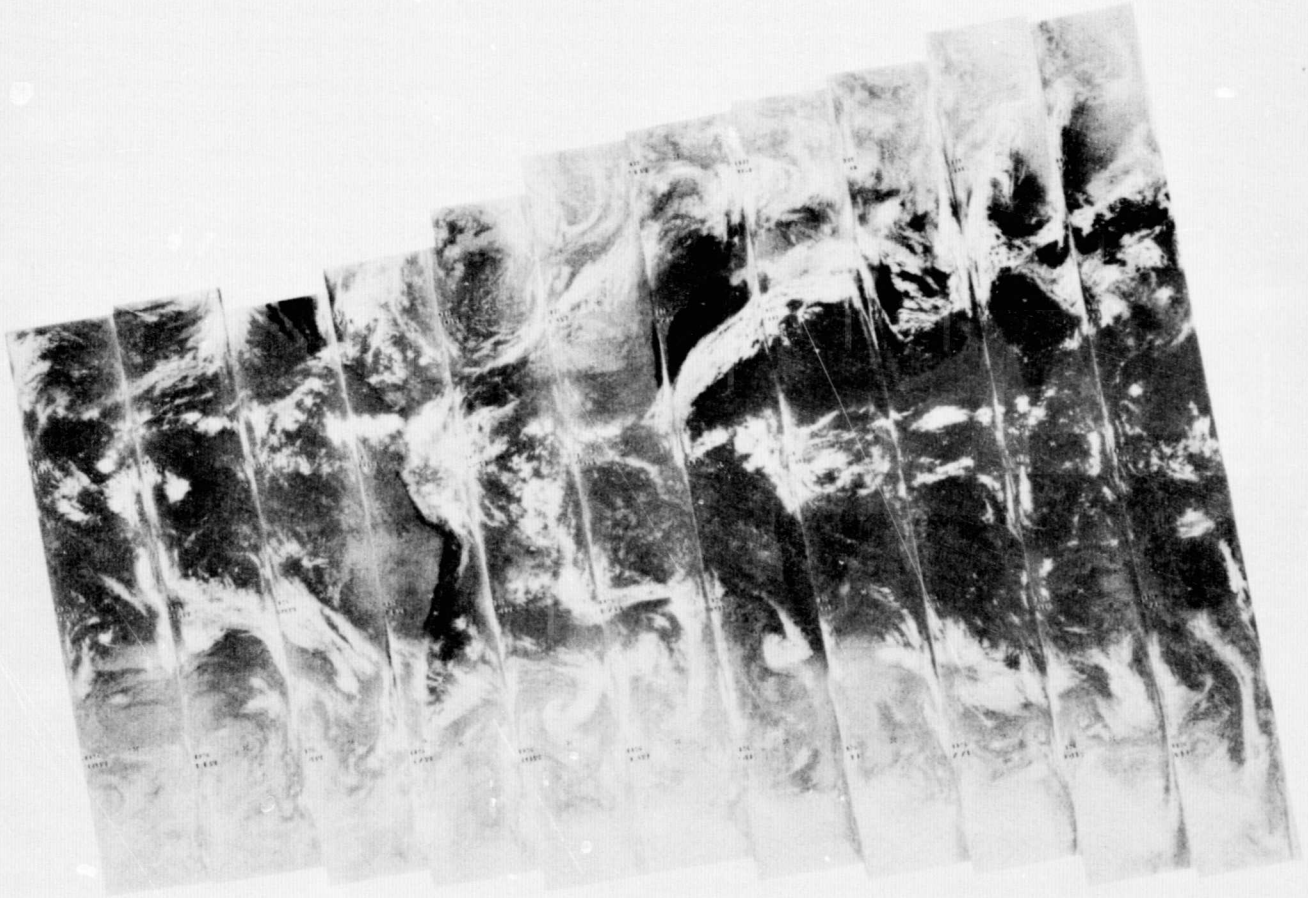
11.5 μm



9105 9104 9103 9102 9101 9100 9099 9098 9097 9096 9095 9094 9093

21 APR 77

6.7 μm



9105 9104 9103 9102 9101 9100 9099 9098 9097 9096 9095 9094 9093

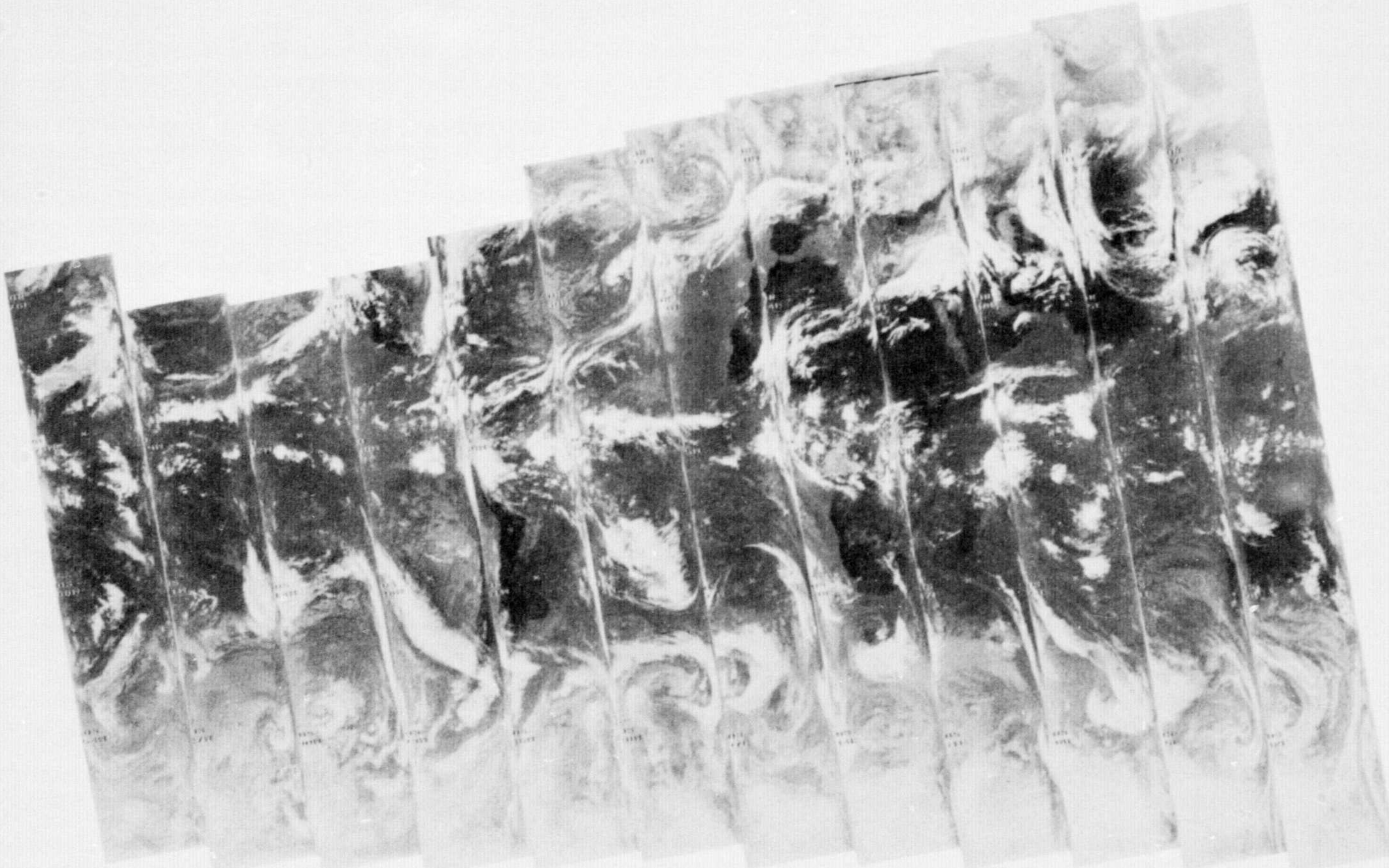
21 APR 77

11.5 μm

9119 9118 9117 9116 9115 9114 9113 9112 9111 9110 9109 9108 9107 9106

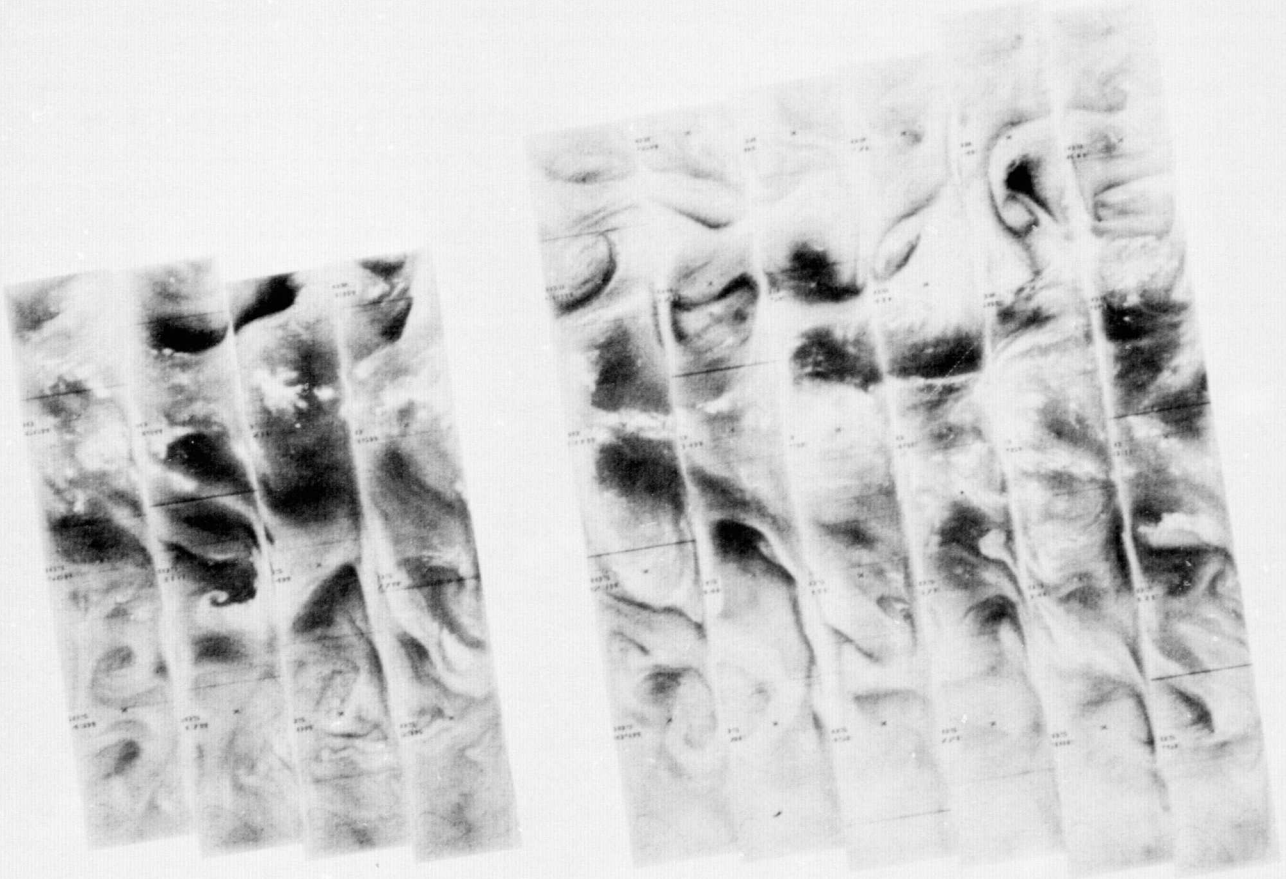
22 APR 77

6.7 μm



22 APR 77

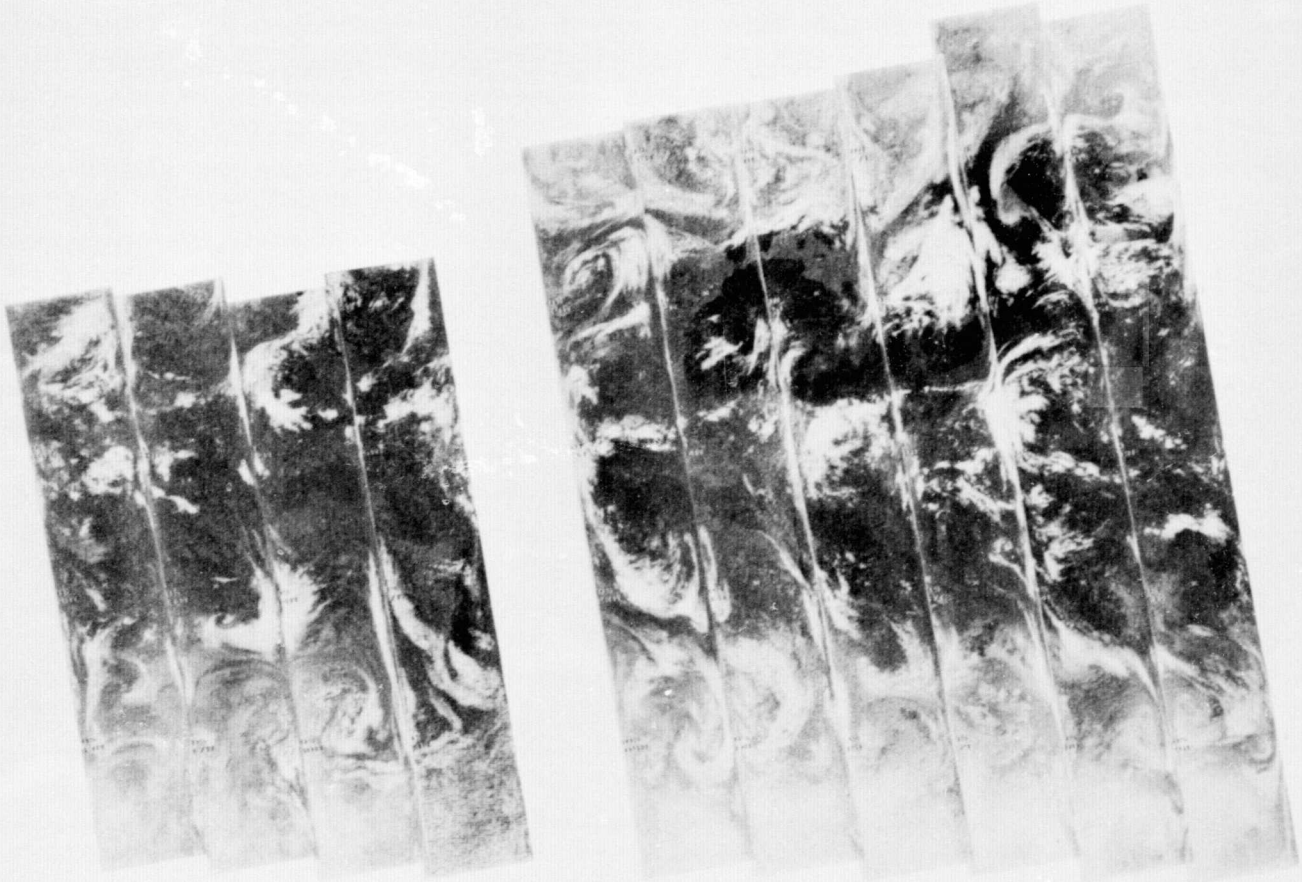
11.5 μm



9132 9131 9130 9129 9128 9127 9126 9125 9124 9123 9122 9121 9120

23 APR 77

6.7 μm



9132 9131 9130 9129 9128 9127 9126 9125 9124 9123 9122 9121 9120

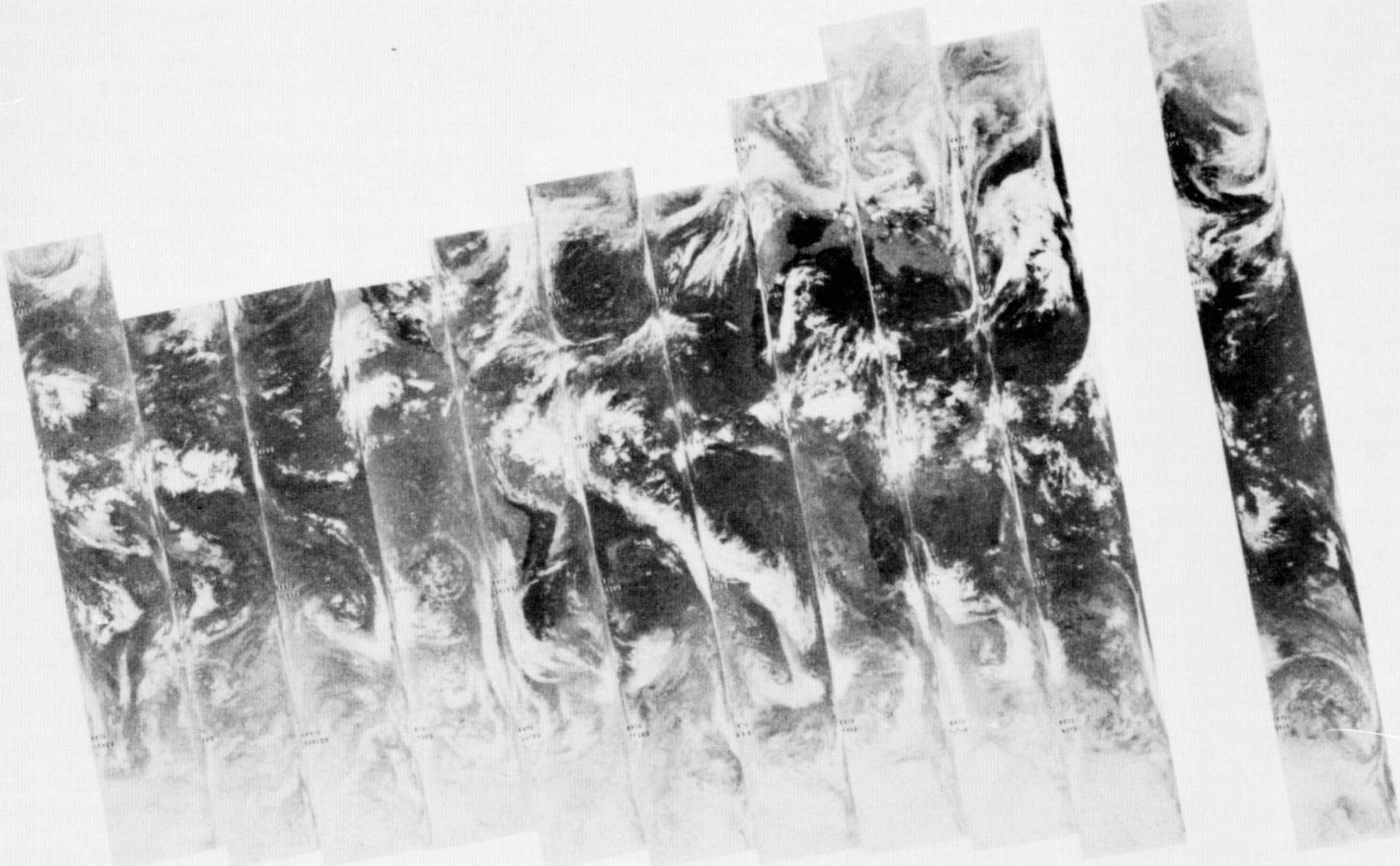
23 APR 77

11.5 μm

9146 9145 9144 9143 9142 9141 9140 9139 9138 9137 9136 9135 9134 9133

24 APR 77

6.7 μm



24 APR 77

11.5 μm

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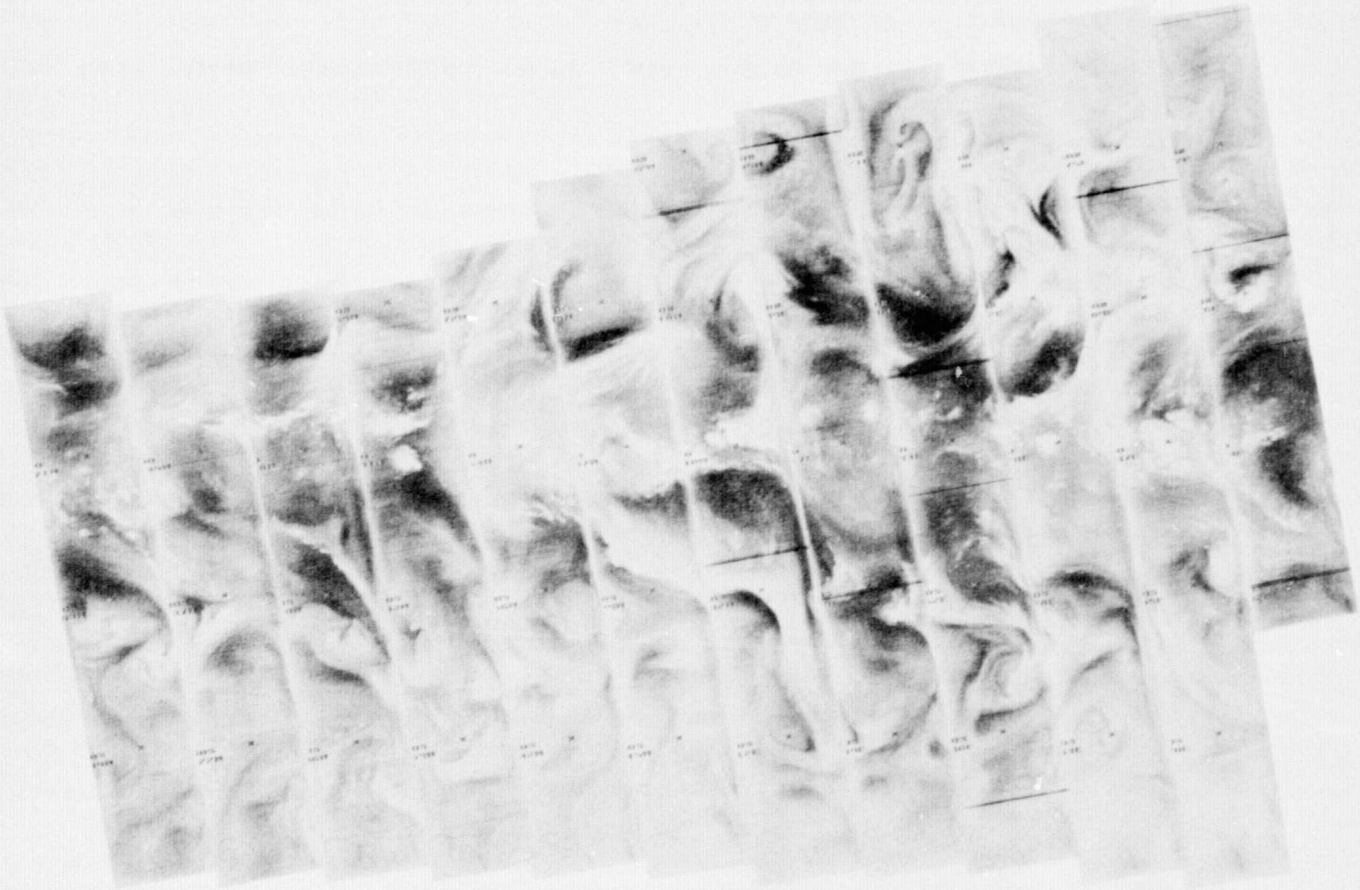
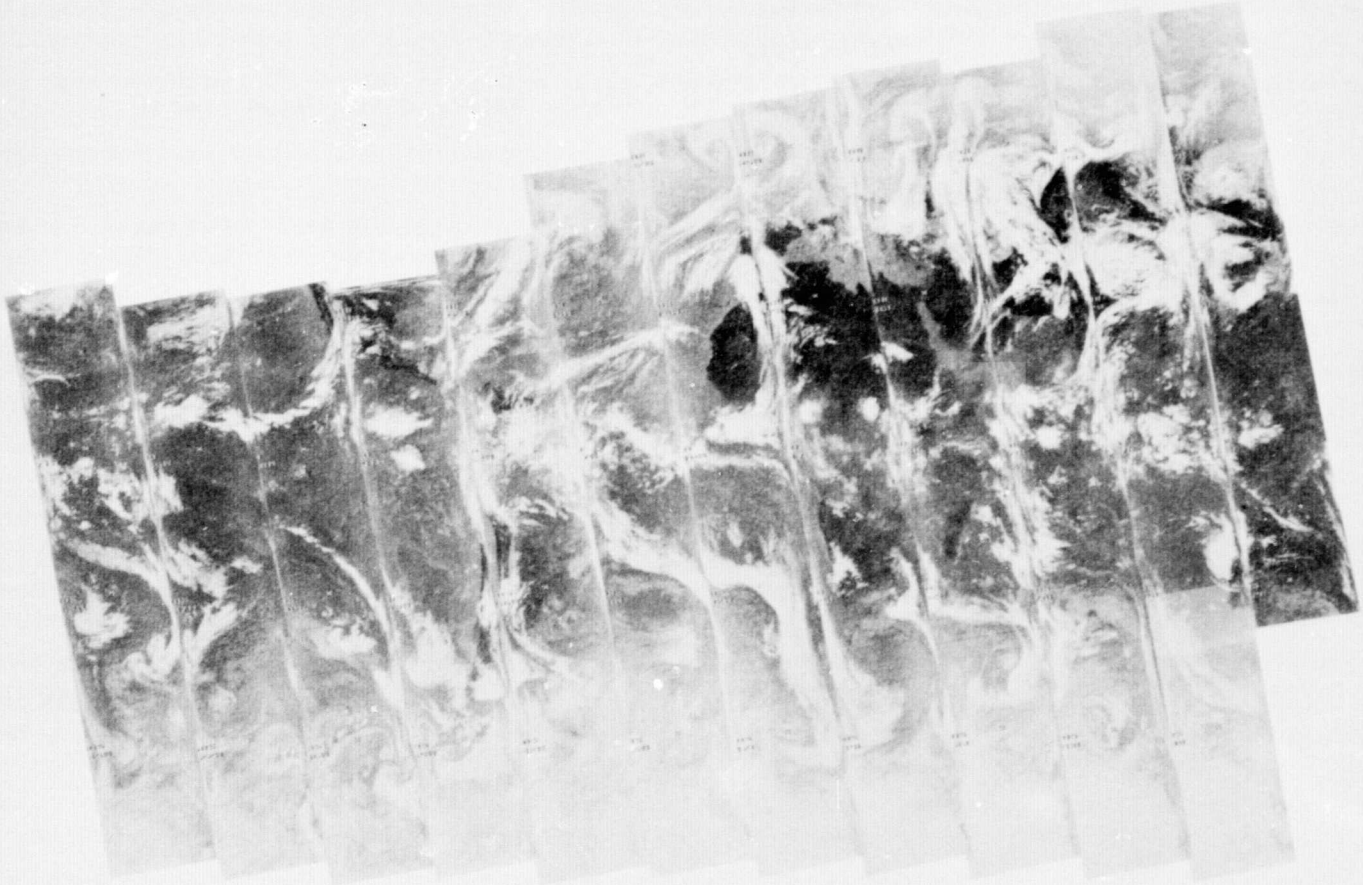


9159 9158 9157 9156 9155 9154 9153 9152 9151 9150 9149 9148 9147

25 APR 77

6.7 μm



9159 9158 9157 9156 9155 9154 9153 9152 9151 9150 9149 9148 9147

25 APR 77

11.5 μm

9172 9171 9170 9169 9168 9167 9166 9165 9164 9163 9162 9161 9160

26 APR 77

6.7 μm

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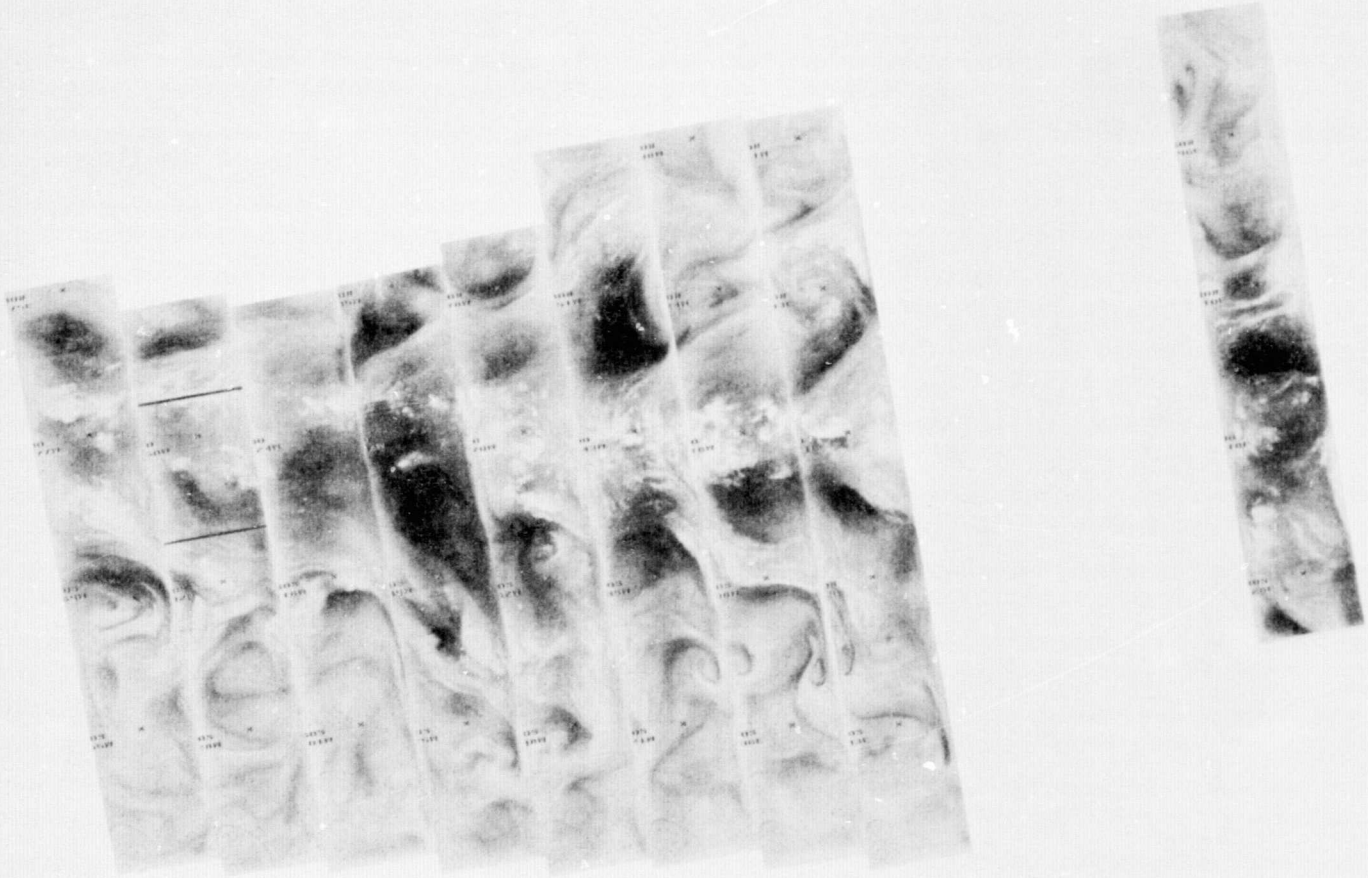
26 APR 77

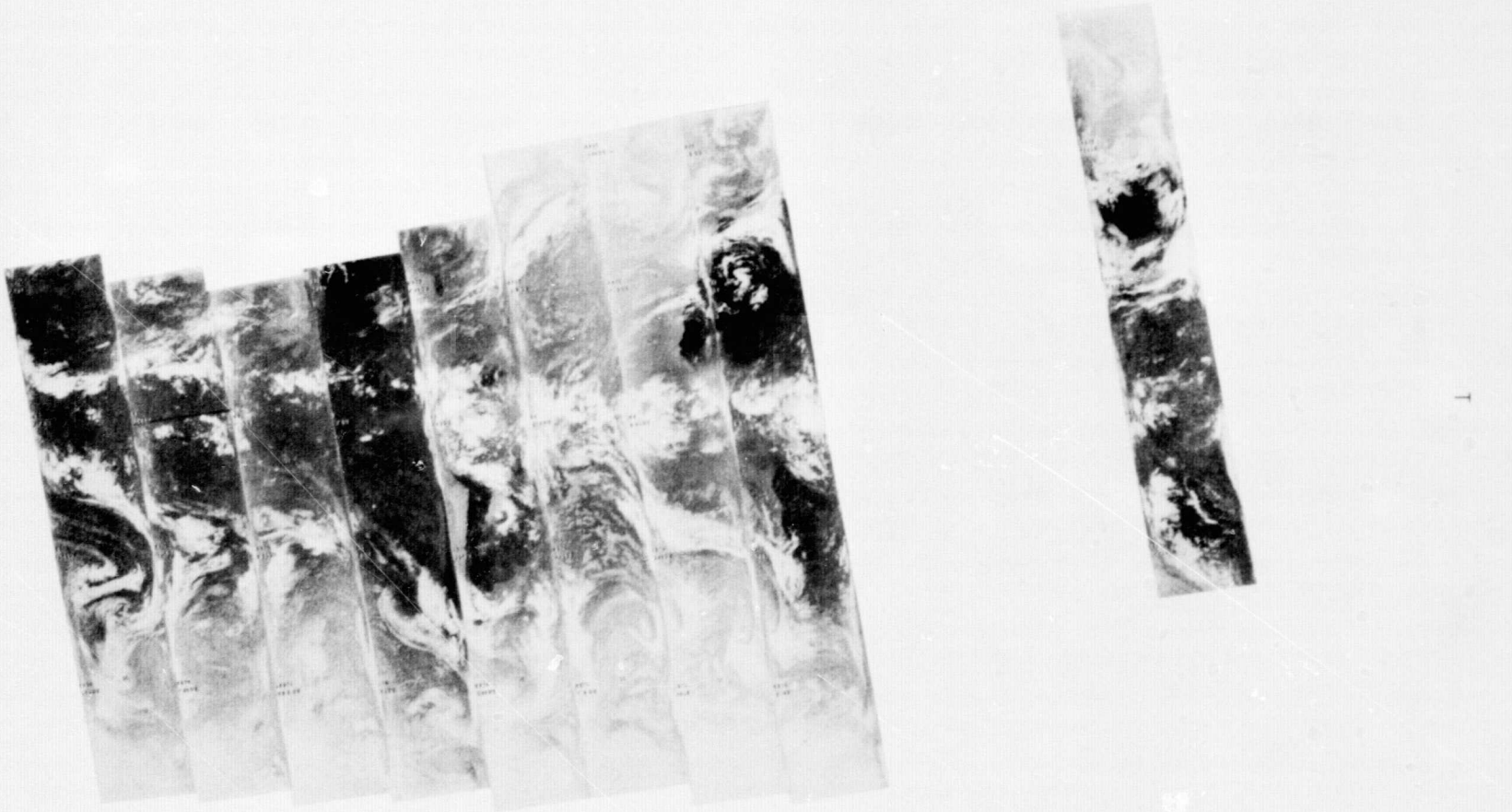
11.5 μm



9186 9185 9184 9183 9182 9181 9180 9179 9178 9177 9176 9175 9174 9173

27 APR 77

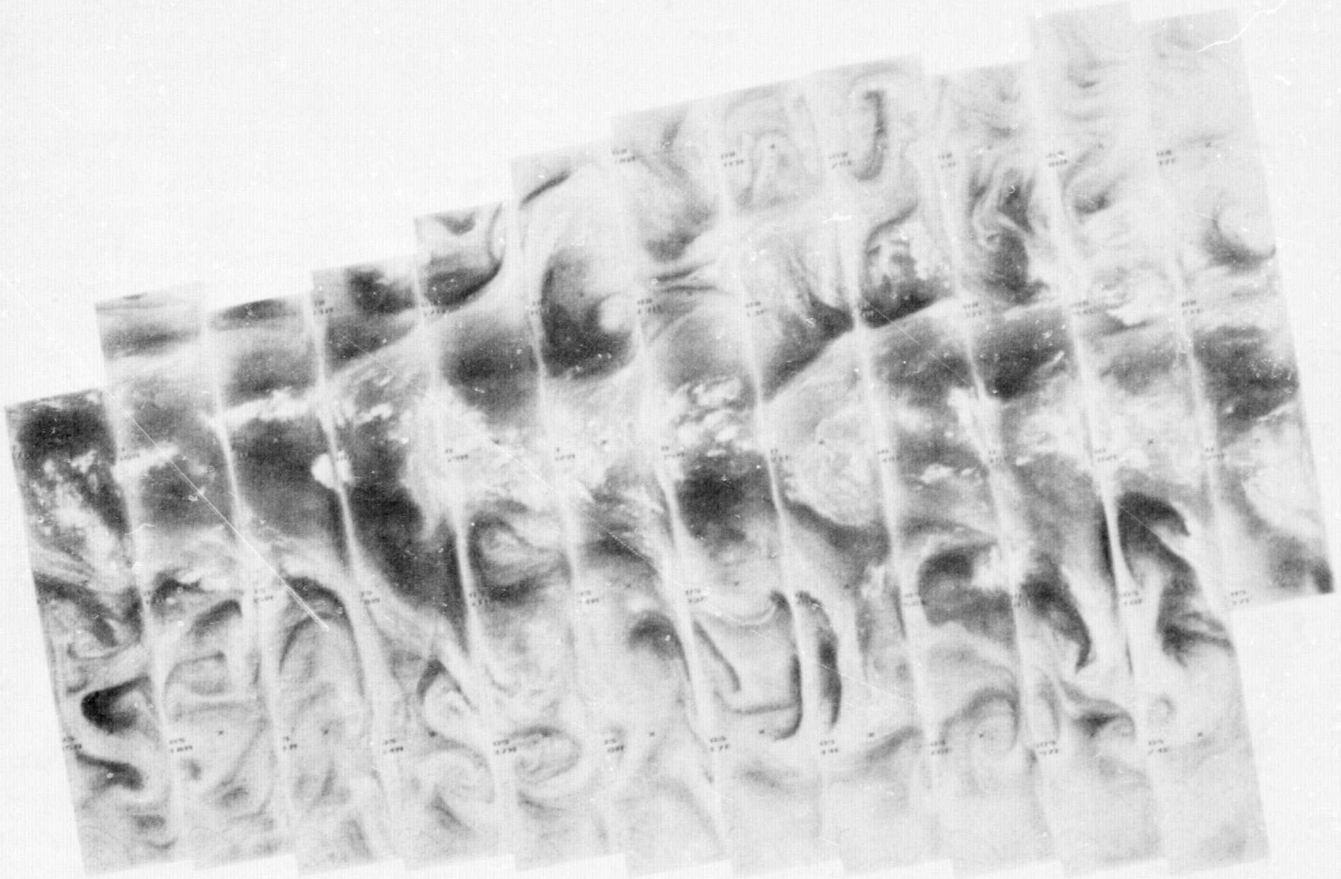
6.7 μm



9186 9185 9184 9183 9182 9181 9180 9179 9178 9177 9176 9175 9174 9173

27 APR 77

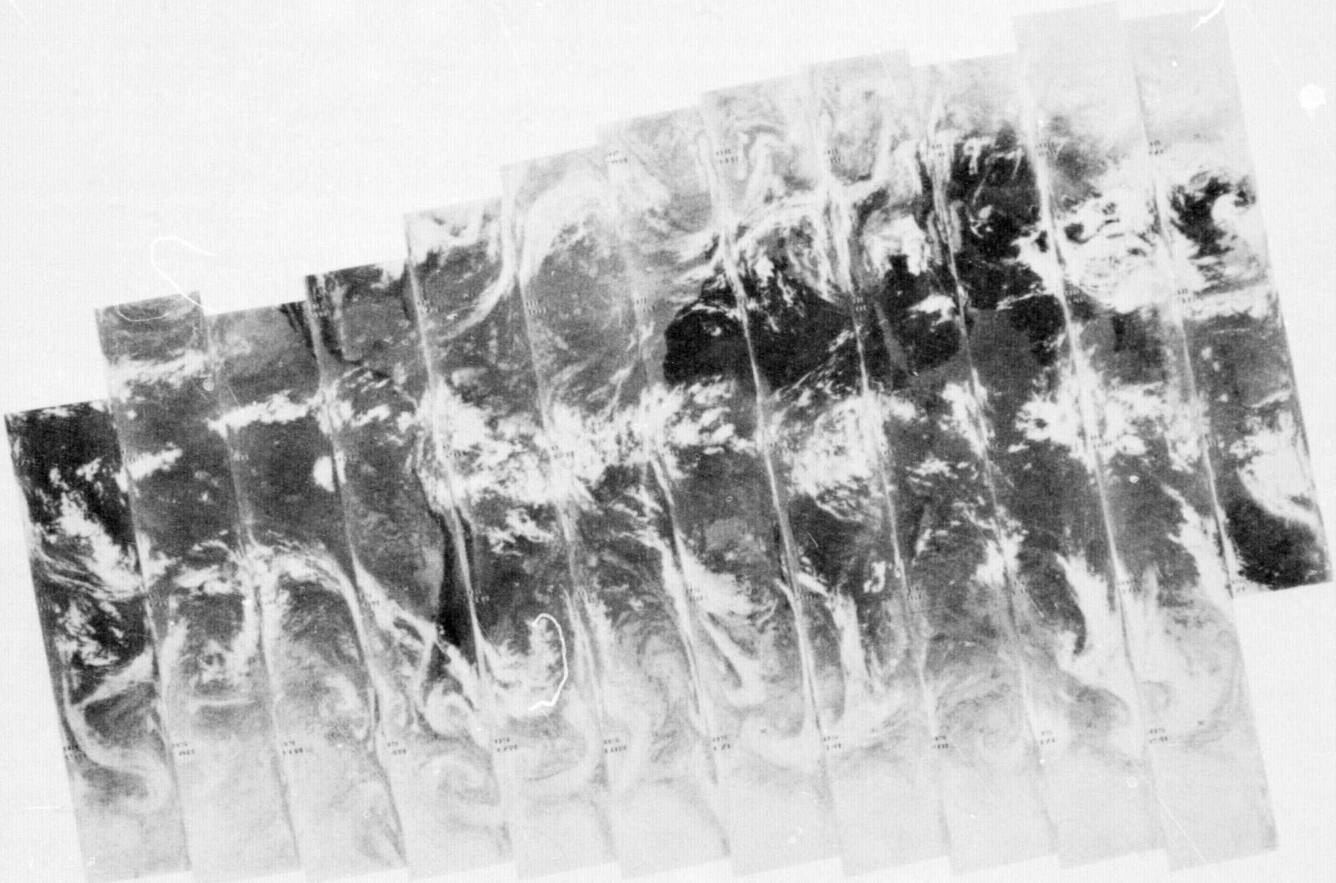
11.5 μm



9199 9198 9197 9196 9195 9194 9193 9192 9191 9190 9189 9188 9187

28 APR 77

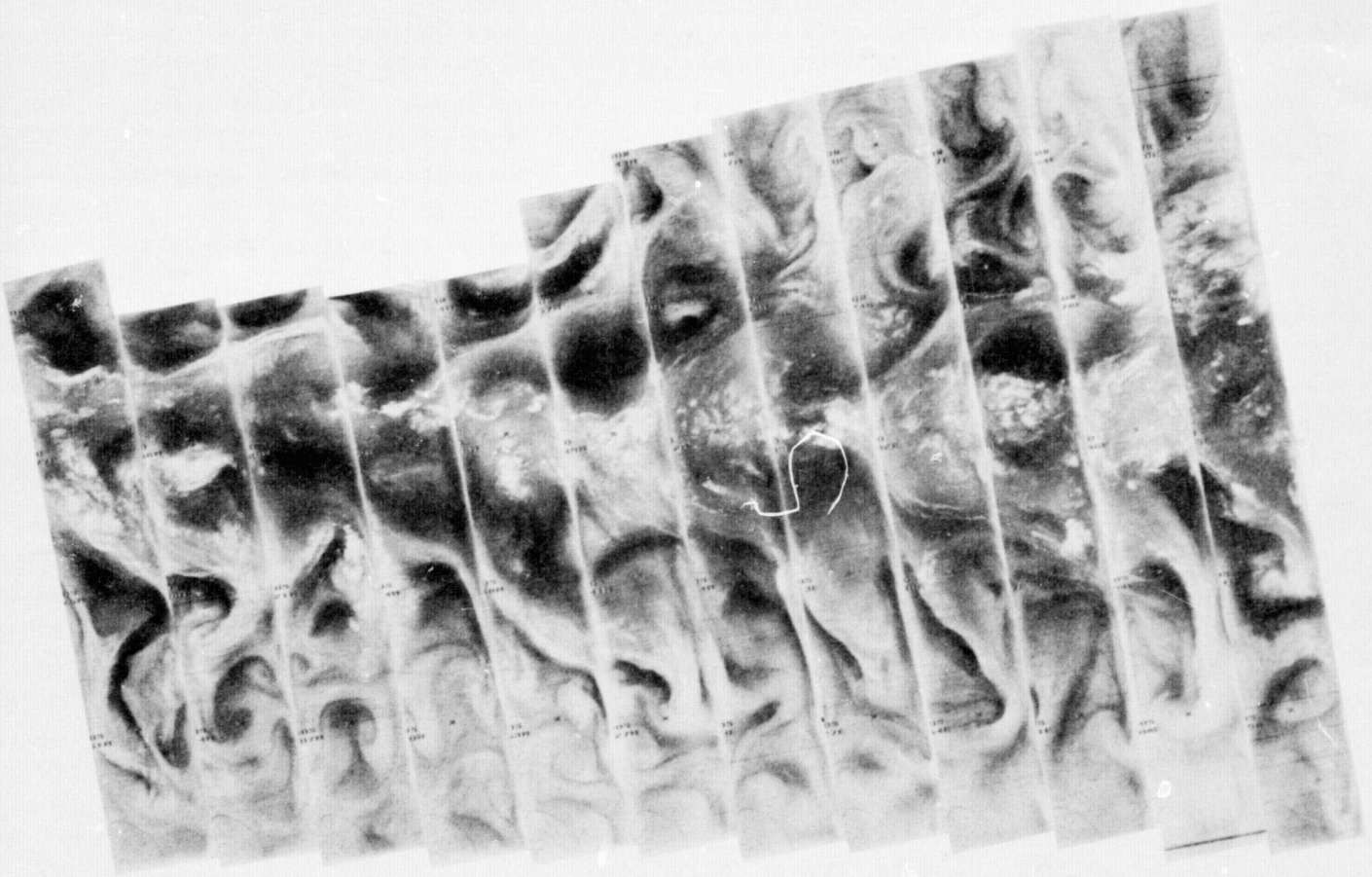
6.7 μm



9199 9198 9197 9196 9195 9194 9193 9192 9191 9190 9189 9188 9187

28 APR 77

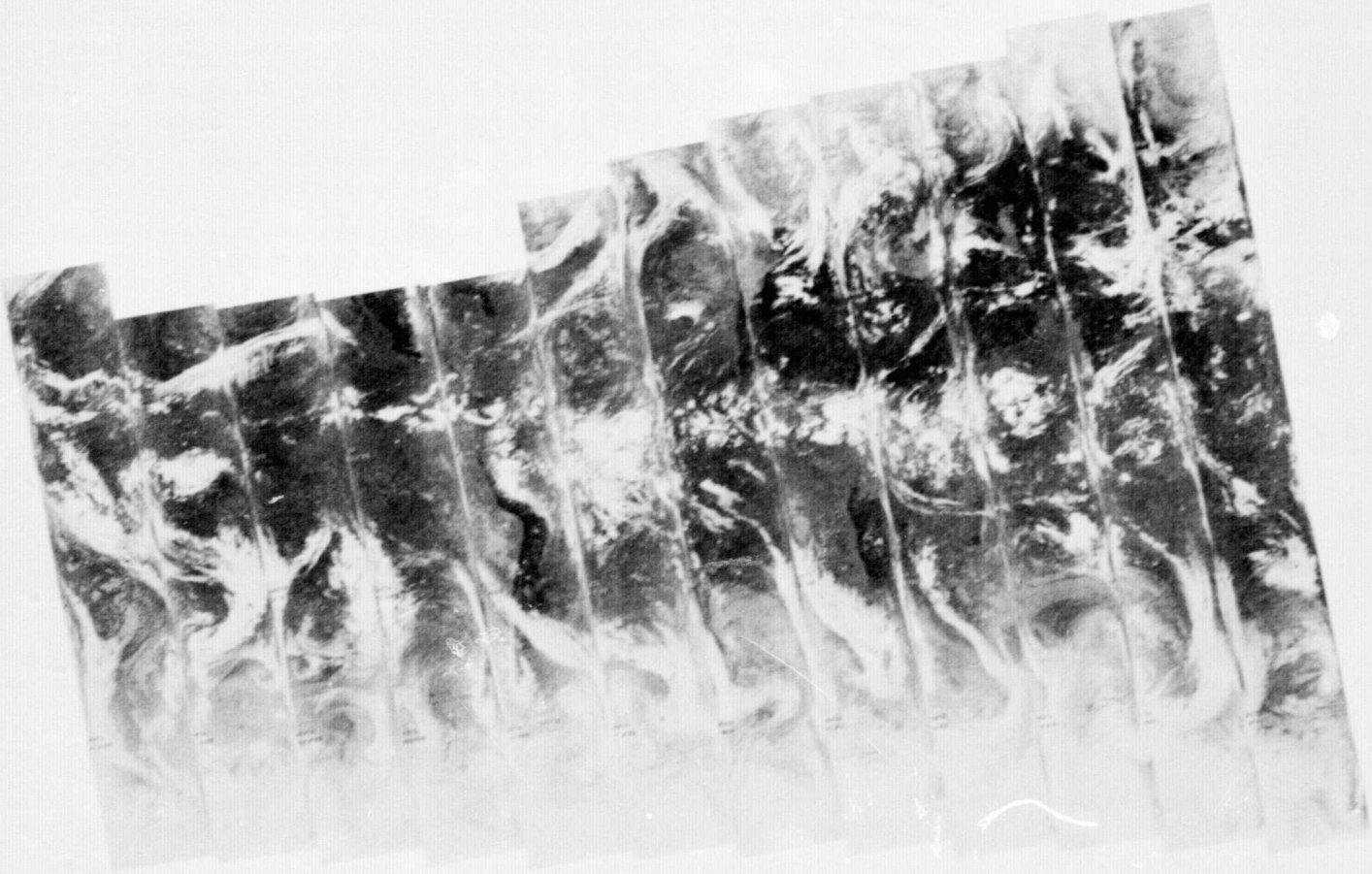
11.5 μm



9213 9212 9211 9210 9209 9208 9207 9206 9205 9204 9203 9202 9201 9200

29 APR 77

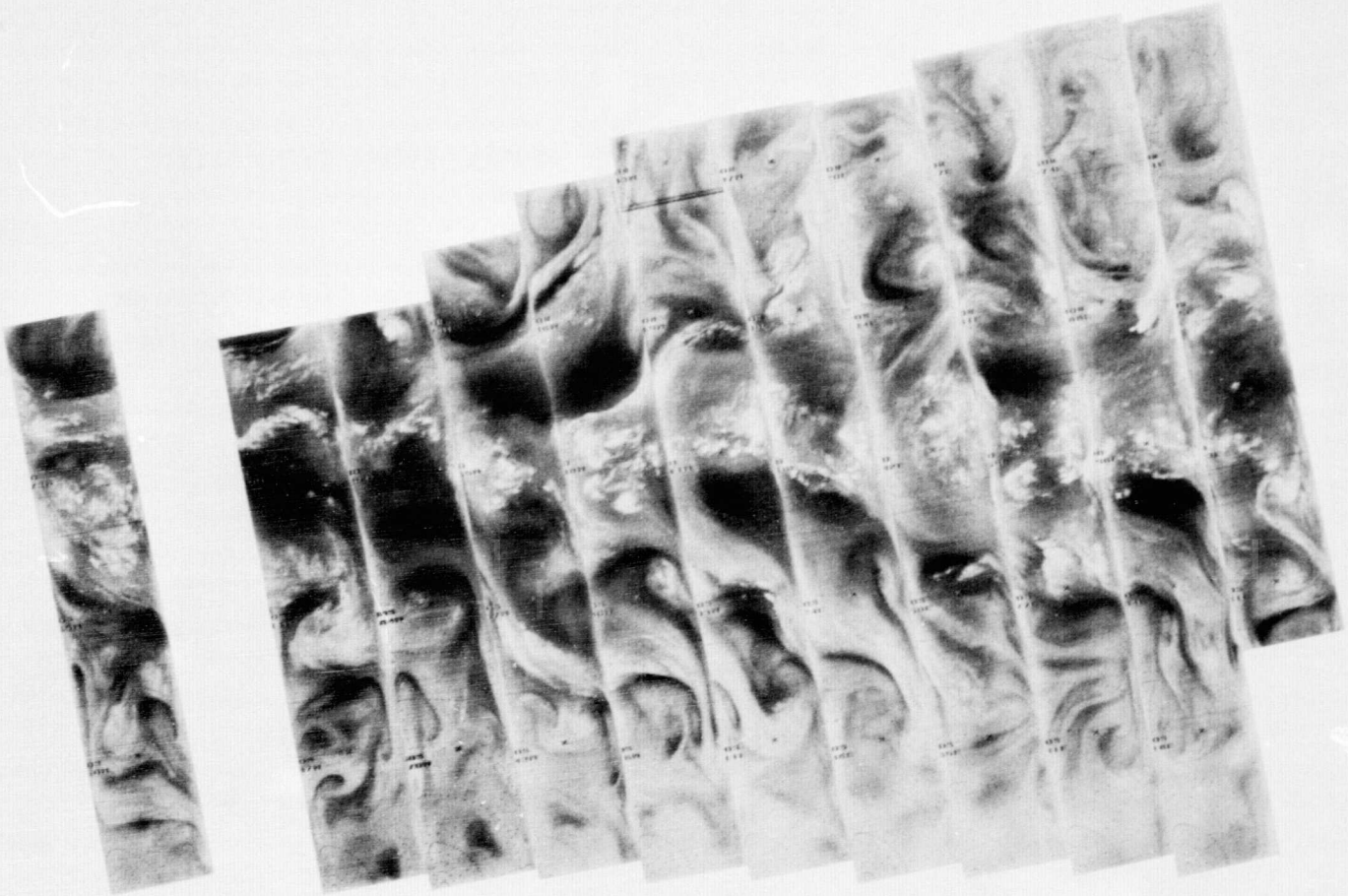
6.7 μm



9213 9212 9211 9210 9209 9208 9207 9206 9205 9204 9203 9202 9201 9200

29 APR 77

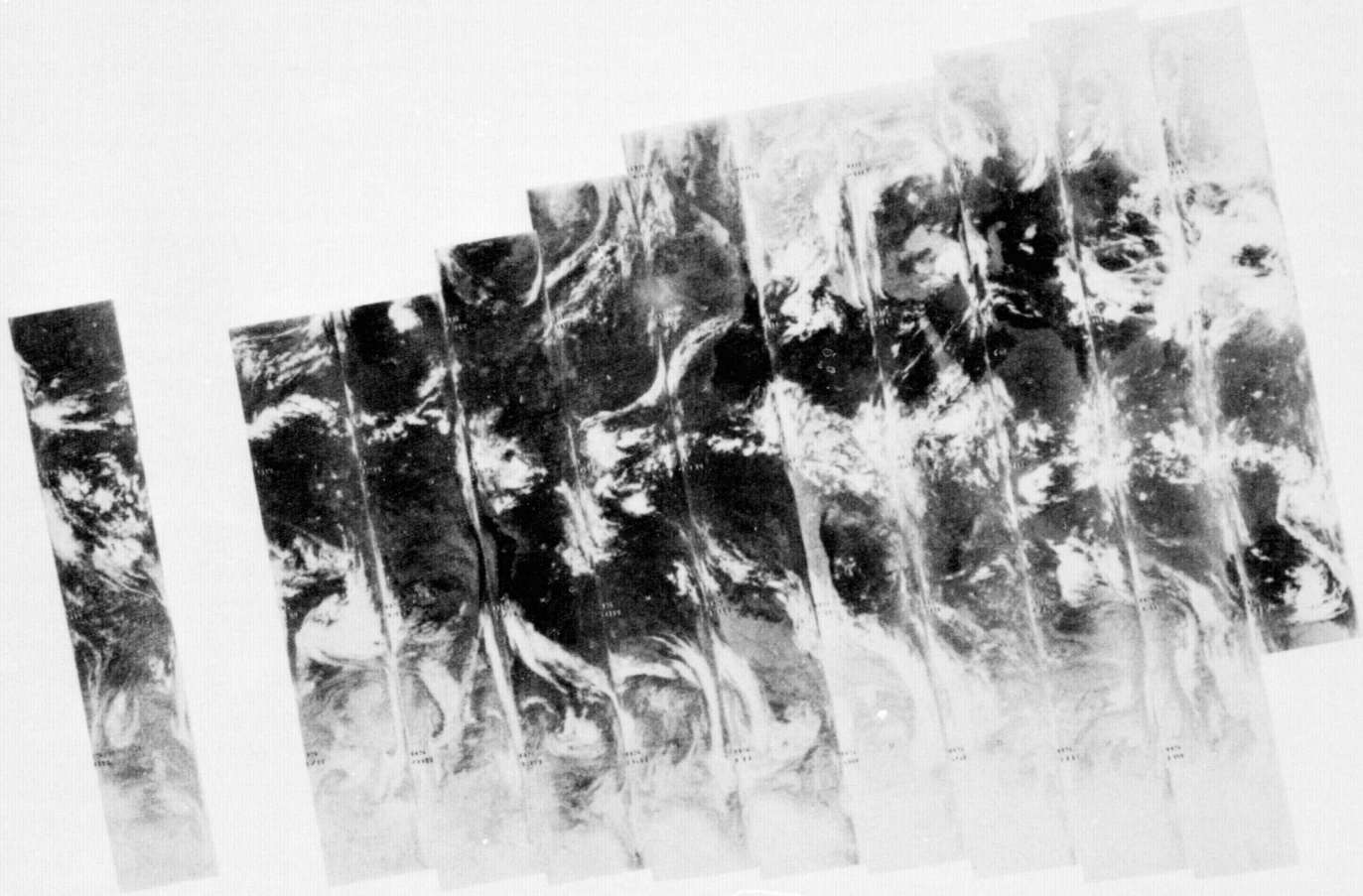
11.5 μm



9226 9225 9224 9223 9222 9221 9220 9219 9218 9217 9216 9215 9214

30 APR 77

6.7 μm



9226 9225 9224 9223 9222 9221 9220 9219 9218 9217 9216 9215 9214

30 APR 77

11.5 μm

SECTION 5

CORRECTIONS TO THE NIMBUS 6 USER'S GUIDE

This section presents all corrections or additions to The Nimbus 6 User's Guide, which now are known to be necessary. If additional corrections are required, they will appear in a subsequent catalog. All corrections will be carried forward cumulatively into each new catalog.

5.1 THIR Corrections to the User's Guide

The THIR mirror on Nimbus 6 rotates counter clockwise. Therefore, replace lines one through four on page 14 with the following:

> ". . . rotation is such that, when combined with the velocity vector of the satellite, a left-hand spiral results. Therefore, the mirror scans across the earth from west to east in the daytime when traveling northward, and from east to west at night when traveling southward."

The information in Figure 2-4 on page 17 is correct. However, the direction of scan is counter clockwise, and not clockwise as shown.

5.2 HIRS Corrections to the User's Guide

On page 40, Table 3-2, under "Detector Summary" change LnSe to LnSb.

The CHANNEL (and) RANGE information in the swath displays for HIRS has been changed since launch, making Table 3-5 on pages 54 and 55 in the User's Guide incorrect. The table below labeled Table 5-1 provides the correct information.

5.3 SCAMS Corrections to the User's Guide

The information contents of the image in the swath displays for SCAMS has been changed since launch, making Tables 4-5, 4-6, and 4-7 in the User's Guide incorrect. Thus, the table below labeled Table 5-2 replaces Tables 4-5 and 4-6 in the User's Guide, and the table labeled 5-3 replaces Table 4-7 in the User's Guide. All the images display the same parameters. Therefore, these new tables do not list all the possible displays, as were listed in the old Tables 4-5, 4-6, and 4-7.

On page 44, Figure 3-3, the SCAMS elements are shown with a right-to-left (clockwise) stepping pattern when looking in the direction of satellite motion. The SCAMS elements should be corrected to show a left-to-right (counterclockwise) stepping pattern.

Table 5-1
This table replaces Table 3-5 on pages 54 and 55 in The Nimbus 6 User's Guide

Table 3-5

Temperature Range of Gray Scale, and Channel of HIRS Data for each Swath on each HIRS Image Display Between Orbit 426 and 4697 (14 July 1975 through 27 May 1976)

		SWATH NUMBER									
		1	2	3	4	5	6	7	8	9	10
Coverage Period 14 July-20 July Orbits 426-513	HIRS Channel Display (channel-range)*	08-08	09-09	10-10	16-16	17-17	18-18	12-12	14-14	03-03	15-15
	Temperature Range (°K) (black to white)	300-200	290-210	260-210	310-270	100-900	0-30	290-210	260-210	240-210	280-210
Coverage Period 22 July-31 July Orbits 538-545 548-549 600-613 615-647 651-657 659	HIRS Channel Display (channel-range)*	08-08	09-09	10-10	16-16	17-17	17-17	12-12	14-14	03-03	15-15
	Temperature Range (°K) (black-white)	300-200	290-210	260-230	310-270	100-900	100-900	280-200	280-200	280-200	280-200
Coverage Period 23 July-6 Aug. Orbits 546-547 553-599 614 648-650 658 660-747	HIRS Channel Display (channel-range)*	08-08	16-16	16-21	18-18	17-17	10-10	12-12	14-14	03-03	15-15
	Temperature Range (°K) (black-white)	300-200	310-270	300-200	0-30	100-900	260-230	280-200	280-200	280-200	280-200

Table 3-5 (Continued)

		SWATH NUMBER									
		1	2	3	4	5	6	7	8	9	10
Coverage Period 7 Aug. - 27 May Orbits 748-4697	HIRS Channel Display (channel-range)*	08-08	16-16	16-21	18-18	17-17	10-10	12-12	14-14	03-03	15-15
	Temperature Range (°K) (black-white)	310-230	310-230	310-270	0-50	100-900	280-210	300-210	300-210 **	240-185	300-185 ***

*The HIRS channel number is number before the hyphen. The number after the hyphen is the computer program table used to display the data from each channel as temperatures (°K). The range of temperatures displayed in each swath is given beneath each "HIRS Channel Display." The 18 steps of the scale are used to represent the division of each temperature range into 18 approximately equal temperature intervals. The central wavelength (in μm) of each channel on these displays is: channel 3 = 14.4, 8 = 11.0, 9 = 8.2, 10 = 6.7, 12 = 4.52, 14 = 4.40, 15 = 4.24, 16 = 3.71, 17 = 0.61, and 18 is the temperature difference between channel 16 and channel 8. The values of channel 17-17 are albedo, represented as "counts" between 100 (blackest) and 900 (whitest). The values for 16-21 represent a second temperature range for channel 16 data. Table 3-1 on page 39 of the User's Guide provides detailed spectral information and the purpose of each of the HIRS channels.

**14-14 temperature range changed to 270-210 on orbit 3166A (26 January 1976)

***15-15 temperature range changed to 275-210 on orbit 3166A (26 January 1976)

Table 5-2

This table replaces Tables 4-5 and 4-6 (on pages 79 through 81) in the Nimbus 6 User's Guide and Table 5-2 in the Nimbus 6 Data Catalog Volume 4

Table 4-5 and 6

Parameter Limits of the Gray Scale for Parameters 1, 2, 3, 5, 11, 12, and 16 on the SCAMS Image Displays between Orbits 426 and 4751 (14 July 1975 and 31 May 1976)

	Swath		1	2	3	4	5
Orbits 426 thru 1425 14 July 75 thru 26 Sept. 75	Parameter		3	2	16	11	12
	Gray Scale Value	black	280 °K	320 °K	10 °K	60 g/mm^2	1.5 g/mm^2
		white	210	100	-22	0.0	-0.1*
Orbits 1426 thru 3675 26 Sept. 75 thru 12 Mar. 76	Parameter		3	2	16	11	12
	Gray Scale Value	black	280 °K	320 °K	10 °K	60 g/mm^2	2.0 g/mm^2
		white	210	100	-22	0.0	0.0
Orbits 3676 thru 3899 12 Mar. 76 thru 29 Mar. 76	Parameter		5	2	16	11	12
	Gray Scale Value	black	240 °K	320 °K	10 °K	70 g/mm^2	2.0 g/mm^2
		white	200	100	-22	0.0	0.0
Orbits 3900 thru 3929 29 Mar. 76 thru 31 Mar. 76	Parameter		1	1	1	5	5
	Gray Scale Value	black	220 °K	265 °K	300 °K	240 °K	280 °K
		white	130	210	260	200	220
Orbits 3930 thru 4584 31 Mar. 76 thru 19 May 76	Parameter		1	1	1	2	3
	Gray Scale Value	black	220 °K	265 °K	300 °K	320 °K	280 °K
		white	130	210	260	100	220
Orbits 4585 thru 4751 19 May 76 thru 31 May 76	Parameter		1	1	1	5	3
	Gray Scale Value	black	220 °K	260 °K	290 °K	240 °K	280 °K
		white	130	200	245	180	220

*1.6 to 0.0 between orbit 426 and 477

Parameters 1, 2, 3, 5, and 16 represent uninverted antenna temperatures for channels 1 (22.24 GHz), 2 (31.65 GHz), 3 (52.85 GHz), and 5 (55.45 GHz). Parameter 16 is the temperature difference between channels 2 and 3. Parameters 11 and 12 represent inverted antenna temperatures of integrated atmospheric water vapor (channel 11) and integrated liquid water from clouds or precipitation.

Table 5-3

This table replaces Table 4-7 (on pages 82 and 83) in The Nimbus 6 User's Guide

Table 4-7

Contour Program Options used for Parameters 13, 14, and 15 on the SCAMS Image Display

Contour options	Parameters			Valid for orbits
	13 Mean temperature between 1000 mb and 500 mb	14 Mean temperature between 500 mb and 250 mb	15 Mean temperature between 250 mb and 100 mb	
Contour interval	4°K	4°K	4°K	426-851 (14 July - 14 Aug. 1975)
Contour thickness	1°K	1°K	1°K	
Contour interval	4°K	4°K	4°K	852-4751 (14 Aug.-1975-31 May 1976)
Contour thickness	2°K	2°K	2°K	

Section 4.5.3 "Tape Format" on page 83 of the User's Guide states that each tape will have "five files, i.e., a short header file. . . and four data files, . . ." There will not be a header file on the archival tape. The sentence should be changed to read: "The tapes will be standard 9-track 1600 BPI tapes, each containing four data files, one for each of four days."

In Table 4-8 on page 80 the "Pitch error" and "Roll error" "Dimensional Units" should be changed to counts (from Deg) and the "Multiplier Used" should be changed to 1 (from 32). In the same table the "Playback orbit" should be followed by one "I*2 Spare", and then by the "Reference orbit", which should be changed to I*4 (rather than I*2). (Reference orbit = year * 100,00 + day * 100 + finish hour.) The "Dimensional Units" for the "Geopotential thicknesses" on page 85 of the same table should be changed to "°K" (from DM).

The following SCAMS information has been edited by the experimenter and briefly outlines the current status of data availability, retrieval methods, and a current table of theoretical brightness temperature values.

The SCAMS instrument operated from June 15, 1975 to May 31, 1976. The data from this experiment has been processed and can be obtained from the National Space Science Data Center at GSFC. The digital data, including instrument output, calibrated antenna temperatures, deconvolved brightness temperatures, and retrieved atmospheric parameters, are recorded on a set of 87 9-track tapes. With three exceptions, each tape contains four contiguous days of data. Channel 1 and 2 brightness temperatures and five atmospheric parameters from these tapes have been dumped in a

condensed format on microfiche. A typical fiche contains somewhat less than two days of data. Photographic images for individual orbits are also available.

At this time, the archived data represent the "first cut" at retrievals, and can be improved with respect to calibration of the oxygen band channels and inversion of the H_2O channels. Data prior to January 2, 1976 was calibrated by assuming the radiometric temperatures of the calibration targets to be equal to their physical temperatures. Comparisons with radiosondes indicated that a more accurate calibration would be obtained with an offset of -1.2 K on the oxygen band target. The archived data starting with January 2, 1976 incorporates this correction. Strictly speaking, the previous data should be recalibrated and reinverted, but for most purposes an adequate approximation can be obtained by simply subtracting 1° from the oxygen band antenna and brightness temperatures and the retrieved temperature profile. No correction was made to the H_2O targets, for lack of evidence that any was necessary.

All of the archived water vapor and liquid water retrievals were obtained by a linear algorithm. Improved retrievals, particularly in humid regions, can be obtained by use of the following nonlinear equations:

$$\text{vapor (mm)} = 72 + 12\,\alpha$$

$$\text{liquid (mm)} = 0.4\,\beta$$

where

$$\alpha = \left[7.34 \ln \left(\frac{280 - T_{01}}{280 - T_{B1}} \right) - 3.75 \ln \left(\frac{280 - T_{02}}{280 - T_{B2}} \right) \right] \cos\theta$$

$$\beta = \left[-3.34 \ln \left(\frac{280 - T_{01}}{280 - T_{B1}} \right) + 9.71 \ln \left(\frac{280 - T_{02}}{280 - T_{B2}} \right) \right] \cos\theta$$

T_{B1} and T_{B2} are the measured brightness temperatures at 22.23 and 31.65 GHz, and T_{01} and T_{02} are brightness temperatures computed for a tropical model atmosphere containing 72 mm precipitable water vapor; the latter are listed in Table 5-4 as a function of view angle θ.

The following information, describing how the antenna temperatures are computed from the SCAMS instrument digital data, should be added after SCAMS Section 4.5 of the User's Guide.

Table 5-4

Theoretical Brightness Temperatures for a Saturated Tropical Troposphere with no Clouds and a Smooth Ocean Surface

(Valid for Period 2 January 1976-31 May 1976)

θ View Angle	T_{01}	T_{02}
0	225.6	178.2
8°	225.9	177.9
17°	226.9	177.3
26°	229.2	177.5
34°	233.9	180.1
44°	242.0	187.4
53°	254.5	203.0

4.6 Post-launch Calibration

Antenna temperatures are computed from the SCAMS instrument digital data for each of the five channels by the equation:

$$T_A = T_{AS} + \frac{T_{AC} - T_{AS}}{d_{Tc} - d_s}(d - d_s)$$

where T_A is antenna temperature for the earth (positions 0-12), T_{AS} is the space antenna temperature (position 13), T_{AC} is the calibration target antenna temperature (position 14), d is earth data in counts, d_s is space data in counts, and d_c is calibration target data in counts. The digital data matrix is described in Table 4-2 of the Nimbus 6 User's Guide. The space calibration antenna temperature is assumed constant at 3°K for all five channels. The target antenna temperature is computed by

$$T_{AC} = T_C + T_{CO}$$

The constant offset T_{CO} is currently zero for channels 1 and 2. The target temperatures (T_C) are given by

$$T_C = a_0 + a_1 (R - R_{25}) + a_2 (R - R_{25})^2$$

where the thermistor resistances (R) are computed by

$$R = R_1 + \frac{R_2 - R_1}{d_{R2} - d_{R1}} (d_R - d_{R1})$$

and values of the other constants are listed in Table 4-9a. Note that channels 3, 4, and 5 share the same calibration target. Also listed in Table 4-9a are word numbers in the digital data matrix containing data values d_R, d_{R1}, d_{R2}, and the recent addition of the T_{CO} value for channels 3, 4, and 5.

Table 5-5

This table accompanies Section 4.6 "Post-launch Calibration", and should be added to the end of the SCAMS section of the User's Guide

Table 4-9

Thermistor Calibration Constants
used to Calculate the SCAMS Target Temperatures

channel / constant	1	2	3,4,5
a_0	298.16		
a_1	.46485	.46535	.46814
a_2	$3.0 \cdot 10^{-5}$	$2.9 \cdot 10^{-5}$	$3.0 \cdot 10^{-5}$
R_{25}	603.75	602.98	599.71
R_1	495.6		
R_2	603.4		
d_R (word no.)	1	11	2
d_{R1} (word no.)	61		62
d_{R2} (word no.)	71		72

Table 5-6

This table replaces Table 4-9 in Section 4.6 "Post-launch Calibration" and should be added to the end of the SCAMS section of the User's Guide.

Table 4-9a

Thermistor Calibration Constants
used to Calculate the SCAMS Target Temperatures

channel / constant	1	2	3,4,5
a_0	298.16		
a_1	.46485	.46535	.46814
a_2	$3.0 \cdot 10^{-5}$	$2.9 \cdot 10^{-5}$	$3.0 \cdot 10^{-5}$
R_{25}	603.75	602.98	599.71
R_1	495.6		
R_2	603.4		
d_R (word no.)	1	11	2
d_{R1} (word no.)	61		62
d_{R2} (word no.)	71		72
T_{CO}	0		-1.2°K

5.4 ESMR Corrections to the User's Guide

The following are corrected equations for the ESMR Section of the User's Guide:

page 90

$$X\ (km) = (636 + 10.8P = 0.32P^2)\ R_j$$

page 96

$$T_B = T_A - (T_A - T_C)\ \frac{(C - C_A)}{(C_C - C_A)}$$

page 101

$$T_{\substack{\text{Horizontal} \\ \text{True}}} = 1 + a\ T_{\substack{\text{Horizontal} \\ \text{Nominal}}} - T_{\substack{\text{Vertical} \\ \text{Nominal}}}$$

$$T_{\substack{\text{Vertical} \\ \text{True}}} = 1 + b\ T_{\substack{\text{Vertical} \\ \text{Nominal}}} - b\ T_{\substack{\text{Horizontal} \\ \text{Nominal}}}$$

page 106

$$N_i = 256\ (T_{Hi} - 100) + T_{Vi} - 100$$

The following information supplements Section 5.3.2 in the User's Guide.

The display format and temperature ranges of the images in the swath displays for ESMR has been changed twice since launch. The first revision occurred after orbit 3932 in which each ESMR scan line is displayed once prior to orbit 3932 and twice after orbit 3933. Similarly, each of the 71 scan-spot elements is displayed once through orbit 3932 and twice after orbit 3933.

Through orbit 3932 (31 March) the ESMR displays contained 20 swaths of data, as shown in the ESMR image displays up to orbit 3932 in Section 3.3. The swaths are numbered (numbers not shown) from 1 on the left to 20 on the right. Each of the ten swaths on the left has the same geographic coverage. However, each swath displays either horizontally or vertically polarized data at a temperature range as listed in Table 5-5a. The right set of ten swaths has a similar format, and displays the earliest recorded data. If the right swaths were cut and placed above the group on the left, the new display would show the continuous coverage recorded for that orbit. Swaths 1 and 11 have the same polarization and temperature range. Similarly, swaths 2 and 12, 3 and 13, etc., are the same. The tables here labeled 5-8 and 5-9 replace Table 5-5 on page 105 of the User's Guide.

As stated above, the ESMR display format was modified at orbit 3933 (31 March 1976) and again at orbit 6185 (15 September 1976). From orbit 3933 through orbit 6184, the following format was used:

The new displays contain ten swaths of data plus a geographic grid overlay for each swath, as shown in the ESMR image displays after orbit 3933 in Section 3.3, of the Nimbus 6, Data Catalog, Volume 5.

The swaths are numbered (numbers not displayed) from 1 on the left to 10 on the right. Each of the five swaths on the left has the same geographic coverage. However, each swath displays either horizontally or vertically polarized data at a temperature range as listed in Table 5-5b. The right set of five swaths has a similar format, and displays the latest recorded data. If the right swaths were cut and placed below the group on the left, the new display would show the continuous coverage of that display.

Swaths 1 and 6 display the same parameter. That is, the temperature range and polarization for swaths 1 and 6 are the same. Similarly, swaths 2 and 7, 3 and 8, 4 and 9, and 5 and 10 display the same parameters. Table 5-5b is set up to show this duplication of parameter information.

Data time (GMT) references for the left set of five swaths are shown adjacent to the vertical line at the left. Time tick marks are every five minutes with hour and minute annotation every fifteen minutes. Data time references for the right set of five swaths are shown in a similar manner adjacent to the vertical line at the right.

The center portion of the display contains two swaths of grid overlay information: the left grid for overlay on each of the five swaths on the left, and the right grid for overlay on each of the five swaths on the right. The grid longitudes are generated at ten degree intervals between 55 degrees south and 55 degrees north, and at 20 degree intervals from 55 degrees to the Poles. Latitude grids are generated every five degrees. All grid lines consist of a series of dots at one degree intervals. Latitudes are labeled at 60°S, 30°S, EQ, 30°N, and 60°N. Longitude labels are normally placed next to each latitude label.

From orbit 6185 (15 September 1976) through the current data catalog period, the new ESMR image display has the following format:

Since an anomaly renders the Horizontal channel unuseable, the new ESMR format was devised to display the Vertical channel with five different temperature ranges and polarization for each individual swath. That is, the temperature range and polarization for swaths 1 and 6 are the same. Swaths 2 and 7, 3 and 8, 4 and 9, and 5 and 10 display the same parameters. Thus, four additional swaths of data are dedicated to the Vertical channel display for a total of 5 swaths as described above.

Data time (GMT) references and grid overlay information remain unchanged. Please refer to Table 5-10 for new parameter information.

Table 5-7
This table replaces Table 5-5 on page 105 in the User's Guide

Table 5-5

Brightness Temperature Value for each Step of the Gray Scale on ESMR Image Displays for Orbits 426 through 827 (14 July through 12 August 1975)

Gray Scale Number		Swath Number and ESMR Display Parameter									
		1 and 11 (T_H)	2 and 12 (T_V)	3 and 13 $\frac{T_H+T_V}{2}$	4 and 14 (T_H)	5 and 15 (T_V)	6 and 16 $\frac{T_H+T_V}{2}$	7 and 17 (T_H)	8 and 18 (T_V)	9 and 19 $\frac{T_H+T_V}{2}$	10 and 20 (T_V-T_H)
(black)	1	> 200			> 250			> 300			> 50
	2	196-200	same	same	246-250	same	same	296-300	same	same	46-50
	3	193-196	as	as	243-246	as	as	293-296	as	as	43-46
	4	190-193	1 and 11	1 and 11	240-243	4 and 14	4 and 14	290-293	7 and 17	7 and 17	40-43
	5	187-190			237-240			287-290			37-40
	6	184-187			234-237			284-287			34-37
	7	181-184			231-234			281-284			31-34
	8	178-181			228-231			278-281			28-31
	9	175-178			225-228			275-278			25-28
	10	171-175			221-225			271-275			21-25
	11	168-171			218-221			268-271			18-21
	12	165-168			215-218			265-268			15-18
	13	162-165			212-215			262-265			12-15
	14	159-162			209-212			259-262			09-12
	15	156-159			206-209			256-259			06-09
	16	153-156			203-206			253-256			03-06
	17	150-153			200-203			250-253			00-03
(white)	18	< 150			< 200			< 250			< 00

T_H = Brightness temperature derived from the ESMR horizontal polarization channel data

T_V = Brightness temperature derived from the ESMR vertical polarization channel data

Table 5-8

This table follows the new Table 5-6 (above), which replaced Table 5-5 on page 105 in the User's Guide

Table 5-5a

Brightness Temperature Value for each Step of the Gray Scale on ESMR Image Displays
for Orbits 828 through 3932 (13 August 1975 through 31 March 1976)
(Brightness Temperatures are in °K)

Gray Scale Number		Swath Number and ESMR Display Parameter									
		1 and 11 (T_H)	2 and 12 (T_V)	3 and 13 $\frac{T_H+T_V}{2}$	4 and 14 (T_H)	5 and 15 (T_V)	6 and 16 $\frac{T_H+T_V}{2}$	7 and 17 (T_H)	8 and 18 (T_V)	9 and 19 $\frac{T_H+T_V}{2}$	10 and 20 (T_V-0.6T_H)
(black)	1	> 200	> 230	> 210	> 250	> 270	> 250	> 290	> 300	> 280	> 140
	2	196-200	226-230	206-210	246-250	267-270	247-250	287-290	298-300	278-280	136-140
	3	191-196	223-226	203-206	243-246	264-267	244-247	284-287	295-298	275-278	133-136
	4	187-191	219-223	199-203	239-243	261-264	241-244	281-284	293-295	273-275	129-133
	5	183-187	215-219	195-199	235-239	258-261	238-241	278-281	290-293	270-273	125-129
	6	178-183	211-215	191-195	231-235	254-258	234-238	274-278	288-290	268-270	121-125
	7	174-178	208-211	188-191	228-231	251-254	231-234	271-274	285-288	265-268	118-121
	8	169-174	204-208	184-188	224-228	248-251	228-231	268-271	283-285	263-265	114-118
	9	165-169	200-204	180-184	220-224	245-248	225-228	265-268	280-283	260-263	110-114
	10	161-165	196-200	176-180	216-220	242-245	222-225	262-265	278-280	258-260	106-110
	11	156-161	193-196	173-176	213-216	239-242	219-222	259-262	275-278	255-258	103-106
	12	152-156	189-193	169-173	209-213	236-239	216-219	256-259	273-275	253-255	99-103
	13	148-152	185-189	165-169	205-209	233-236	213-216	253-256	270-273	250-253	95-99
	14	143-148	181-185	161-165	201-205	229-233	209-213	249-253	268-270	248-250	91-95
	15	139-143	178-181	158-161	198-201	226-229	206-209	246-249	265-268	245-248	88-91
	16	134-139	174-175	154-158	194-198	223-226	203-206	243-246	263-265	243-245	84-88
	17	130-134	170-174	150-154	190-194	220-223	200-203	240-243	260-263	240-243	80-84
(white)	18	< 130	< 170	< 150	< 190	< 220	< 200	< 240	< 260	< 260	< 80

T_H = Brightness temperature derived from the ESMR horizontal polarization data

T_V = Brightness temperature derived from the ESMR vertical polarization data

Table 5-9

This table follows the new Table 5-5a (above), which replaced Table 5-5 on page 105 in the User's Guide

Table 5-5b

Brightness Temperature Value for each Step of the Gray Scale on ESMR Image Displays for Orbits 3933 through 6184 (31 March through 15 September 1976)

(Brightness Temperatures are in °K)

Gray Scale Number		Swath Number and ESMR Display Parameter				
		1 and 6 (T_H)	2 and 7 (T_H)	3 and 8 (T_H)	4 and 9 (T_V)	5 and 10 $\left(\frac{T_H + T_V}{2}\right)$
(black)	1	>200	>230	>210	>250	>270
	2	196-200	226-230	206-210	246-250	267-270
	3	191-196	223-226	203-206	243-246	264-267
	4	187-191	219-223	199-203	239-243	261-264
	5	183-187	215-219	195-199	235-239	258-261
	6	178-183	211-215	191-195	231-235	254-258
	7	174-178	208-211	188-191	228-231	251-254
	8	169-174	204-208	184-188	224-228	248-251
	9	165-169	200-204	180-184	220-224	245-248
	10	161-165	196-200	176-180	216-220	242-245
	11	156-161	193-196	173-176	213-216	239-242
	12	152-156	189-193	169-173	209-213	236-239
	13	148-152	185-189	165-169	205-209	233-236
	14	143-148	181-185	161-165	201-205	229-233
	15	139-143	178-181	158-161	198-201	226-229
	16	134-139	174-178	154-158	194-198	223-226
	17	130-134	170-174	150-154	190-194	220-223
(white)	18	<130	<170	<150	<190	<220

T_H = Brightness temperature derived from the ESMR horizontal polarization data

T_V = Brightness temperature derived from the ESMR vertical polarization data

Table 5-10

Brightness Temperature Value for each Step of the Gray Scale on ESMR Image Displays for Orbits 6185 (15 September 1976) through the Present Catalog Period

(Brightness Temperatures are in °K)

Gray Scale Number	Swath Number and ESMR Display Parameter				
	1 and 6 (T_V)	2 and 7 (T_V)	3 and 8 (T_V)	4 and 9 (T_V)	5 and 10 (T_V)
(black) 1	> 240	> 254	> 270	> 280	> 300
2	236-240	251-254	266-270	277-280	296-300
3	233-236	248-251	263-266	274-277	293-296
4	230-233	245-248	260-263	271-274	290-293
5	227-230	242-245	257-260	268-271	287-290
6	224-227	239-242	254-257	265-268	284-287
7	221-224	236-239	251-254	262-265	281-284
8	218-221	233-236	248-251	259-262	278-281
9	215-218	230-233	245-248	256-259	275-278
10	212-215	227-230	242-245	253-256	272-275
11	209-212	224-227	239-242	250-253	269-272
12	206-209	221-224	236-239	247-250	266-269
13	203-206	218-221	233-236	244-247	263-266
14	200-203	215-218	230-233	241-244	260-263
15	197-200	212-215	227-230	239-241	257-260
16	193-197	208-212	223-227	237-239	253-257
17	190-193	205-208	220-223	235-237	250-253
(white) 18	< 190	< 205	< 220	< 235	< 250

T_V = Brightness temperature derived from the ESMR vertical polarization data

5.5 ERB Corrections to the User's Guide

Post-launch calibration procedures are described below. While some numbers are for the period of this catalog, the calibration procedure is valid for all data. This information can be added as Section 6.5a to the User's Guide and would fit on page 134.

6.5a Post-launch Calibration

The observations from the wide angle channels (11 and 12), which measure the total energy ($<0.2\ \mu m$ to $>50\ \mu m$) emitted and reflected by the earth, depend on the prelaunch calibration and pertinent instrument temperatures. Assuming unit emissivity for the target scene, the irradiance from the scene is given by,

$$H_T = [\Delta W - \epsilon_s F_s \sigma T_s^4 + \epsilon_d F_d \sigma (T_d + K v)^4]$$

where

ΔW = effective thermopile irradiance (w m^{-2})

σ = 5.6697×10^{-8} w m^{-2} (deg. K)$^{-4}$

ϵ_s = emissivity of FOV stop = 0.965

F_s = view factor of the FOV stop = 0.18892

T_s = temperature (°K) of the FOV stop

ϵ_d = emissivity of the thermopile = 0.977

F_d = view factor of the thermopile = 0.80461

T_d = temperature (°K) of the thermopile base

K = factor relating thermopile base temperature to thermopile surface temperature = 0.0031°K per count

v = thermopile output in digital counts

The effective thermopile irradiance (ΔW) is obtained from the thermopile output (v) as follows:

$$\Delta W = a_o\ (T_m) + a_1\ (T_m) \cdot v$$

where

$$a_o = C_o + C_1\ T_m,$$

and

$$a_1 = d_o + d_1\ T_m$$

are derived from prelaunch calibrations and depend on the module temperature (T_m, °C). The coefficients C_0, C_1, d_0, d_1 are given below. In calibrating channel 11 and channel 12 (W) with the FOV stop out, the quantity F_s in the equation for H_T is set to zero.

	Ch. 11	Ch. 12 (W)	Ch. 12 (N)
C_0:	9.86	10.4	8.38
C_1:	0.18358	0.23235	0.18483
d_0:	0.6042	0.6035	0.6014
d_1:	-8.254×10^{-4}	-6.109×10^{-4}	-5.879×10^{-4}

The observations from the other two wide-angle channels (13 and 14), which measure the shortwave radiation (0.2 μm to 4.0 μm), and (0.7 μm to 3.0 μm), are transformed to irradiance (H) by,

$$H = \frac{(V-V_o)}{S_T}$$

where V is the digital counts, V_o is the offset (in counts) observed from dark FOV's, and S_T is the sensitivity (w m^{-2} $count^{-1}$) obtained from the equation: $S_T + S_0(1+(0.01) \cdot (T-25) \cdot STC)$, where S_o is the sensitivity at 25°C, T is the detector temperature (°C), and STC is the sensitivity temperature coefficient (percent per degree C). These constants are given below:

Ch	V_o	S	STC
13	-41	2.004	0.04
14	-44	3.989	0.03

The interpretation of digital counts (V) from the shortwave scanning channels (15-18) gives the radiance (w m^{-2} sr^{-1}) of the scene (N_s) by,

$$N = \frac{(V-V_o)}{S_T}$$

where V_o is the offset (counts) obtained during views of the internal blackbody or space. The sensitivity S_T at temperature T(°C) is obtained using the equation for S_T described above, and the constants given below.

Ch	V_o	S	STC
15	-3	3.155	0.0
16	0	3.275	0.03
17	-1	3.116	-0.01
18	15	2.963	-0.05

A series of checks on the sensitivity of these channels, using the on-board diffuse target, indicated no noticeable degradation over the July-August period of operation.

The longwave scanning channels (19-22) have had numerous inflight calibrations which have remained essentially unchanged since 3 July. The calibration coefficients, a_0 and a_1 relate digital counts (V) to the scene radiance N (w m^{-2} sr^{-1}) as follows:

$$N_s = N_m + a_o + a_1 \cdot V$$

where N_m is the radiance of the detector module. The radiance N_s is the actual radiance measured within the spectral limits of the filter (4.5 μm to 50 μm). The calibration coefficients, obtained from inflight calibrations on 3 July, are as follows:

Ch	a_0	a_1
19	-0.82	0.09583
20	-0.60	0.10535
21	-1.26	0.10168
22	-0.29	0.10338

The deviations of these calibration coefficients as derived from inflight calibrations from 29 July to 20 August are shown in Table 6-6a. The only change which indicates a need for updating the calibration coefficients is the change in the intercept of channel 20.

Periodic checks of the electronic gains of channels 1 through 14 have shown that the electronic gains have remained within 0.5 percent of the prelaunch values, with few exceptions. Table 6-6a shows the percentage of maximum deviation in the gain ratios (current/prelaunch) for the three steps in the calibration staircase voltage. The 6.5 percent change in the high-level gain of channel 2 and the gain changes in channels 6, 7, and 8 are believed to be caused by radio-frequency interference with the electronic calibration circuit and is neither a real change in the electronic gain nor nonlinearities of the channels.

Table 5-11

This table is part of the new Section 6.5a "Post-launch Calibration" to be added to the ERB section of the User's Guide

Table 6-6a

Stability of Calibration of the
ERB Longwave Scanning Channels
(between 29 July and 20 August 1975)

	Channel 19		Channel 20		Channel 21		Channel 22	
Date	Δa_o	Δa_1	Δa_o	Δa_1	Δa_o	Δa_1	Δa_o	Δa_1
7/29	-0.07	-0.4	1.12	0.5	-0.07	-0.4	0.36	-0.3
8/5	0.50	-0.3	1.22	0.1	0.08	-0.3	0.11	-0.2
8/8	0.68	-0.4	1.33	0.1	0.04	-0.2	-0.003	-0.1
8/12	-0.06	-0.2	0.74	-0.4	-0.09	-0.3	0.17	-0.2
8/17	0.69	-0.3	1.49	0.2	0.20	-0.3	0.16	-0.2
8/20	-0.22	-0.3	1.53	0.2	0.04	-0.2	0.13	-0.4

Δa_o = change in intercept (w m^{-2} sr^{-1})

$= (a_o)_{current} - (a_o)_{7/3/75}$

Δa_1 = change in slope (% w m^{-2} sr^{-1} ct^{-1})

$$= \frac{[(a_1)_{current} - (a_1)_{7/3/75}]}{(a_1)_{7/3/75}} \times 100$$

Table 5-12

This table is part of the new Section 6.5a "Post-launch Calibration" to be added to the ERB section of the User's Guide

Table 6-6b

Percentage Change of the Maximum Deviation in the Gain Ratio between Post-launch and Prelaunch Gain Values for ERB channels 1 through 14 (20 June and 17 August 1975)

Ch	$G_{0\text{-}39}$	$G_{30\text{-}60}$	$G_{60\text{-}90}$
1	-0.2	0.2	-0.1
2	0.1	-0.3	-6.5
3	±0.1	-0.1	-0.2
4	±0.1	-0.2	-0.1
5	±0.1	-0.2	0.2
6	2.6	1.8	-2.1
7	1.3	2.1	-0.6
8	1.6	1.3	-0.9
9	0.4	-0.6	±0.1
10	0.7	-0.5	±0.2
11	-0.4	0.3	0.4
12	0.2	-0.2	0.4
13	-0.3	0.2	0.3
14	+0.2	-0.1	0.3

Table 6-7, the ERB Compacted Archival Tape Format, on pages 136 through 139 of the User's Guide, should be changed as follows:

Directory Record (Page 136)

Delete last line of section A which reads:

"135-340	Zero fill	1"

and add the following:

135-149	Orbital Elements	
135	Day of Epoch	1
136	Year of Epoch	1
137	Hours	1
138	Minutes (including fraction)	100
139	Eccentricity	10^5
140	Argument of Perigee (integer part)	1
141	Argument of Perigee (fraction part)	10^3
142	Right Ascension (integer part)	1
143	Right Ascension (fraction part)	10^3
144	Inclination (integer part)	1
145	Inclination (fraction part)	10^3
146	Semimajor Axis (km, integer part)	1
147	Semimajor Axis (km, fraction part)	10^3
148	Mean Anomaly (integer part)	1
149	Mean Anomaly (fraction part)	10^3
150	Sun-Earth Distance (A. U.)	10^4
151-340	Zero fill	1

Orbital Summary Record (Page 139)

Delete last line of table, which reads:

17-340	Zero fill	1"

and add the following:

17-26	Solar Irradiances (Chs. 1-10)	Chs. 1-5:10
	Normalized to mean sun-earth distance	Chs. 6-10:100
27	Solar Channels Assembly Gamma Angle (positive to right of track)	1
28-340	Zero fill	1

5.6 LRIR Corrections to the User's Guide

Table 5-13

Post-launch analysis of relative spectral response data and orbital data leads to the following corrected values for Table 7-2, on page 154 of the User's Guide

Table 7-2

Optical Characteristics of LRIR Channels

Channel		Band Pass (50% Peak Response)	Field-of-view (km)		Random noise in orbit* $\pm 1\sigma$(watts/m^2-sr)
No.	Abbrev.		Vertical	Horizontal	
1	NCO_2	649-672 cm^{-1} (14.9-15.4 μm)	2.0	20	0.0023
2	BCO_2	592-700 cm^{-1} (14.3-16.9 μm)	2.0	20	0.0040
3	O_3	984-1169 cm^{-1} (8.6-10.2 μm)	2.0	20	0.011
4	H_2O	412-446 cm^{-1} (22.4-24.3 μm)	2.5	25	0.008

*Noise will gradually increase as the detector temperature increases during the useful life of the experiment.

5.7 PMR Corrections to the User's Guide

There are no PMR corrections to the User's Guide.

5.8 TWERLE Corrections to the User's Guide

Table 5-14

The following are address changes to Table 9-2
on page 186 in the User's Guide

Table 9-2

Nimbus RAMS Experiments - Address Changes

Address Changes

OLD	NEW
Mr. G. R. Cresswell Division of Fisheries & Oceanography Commonwealth Scientific & Industrial Research Organization Melbourne, Australia	Mr. G. R. Cresswell Division of Fisheries & Oceanography CSIRO P. O. Box 21 Cronulla, N. S. W. 2230 Australia
A. J. Dyer CSIRO P. O. Box 77 Mordialloc, Vic 3195 Australia	Dr. A. J. Dyer Division of Atmospheric Physics CSIRO Station Street ASPENDALE 3195 Victoria, Australia
Professor Pierre Lacombe, Director Laboratory d'Oceanographic Museau Historie Naturelle de Paris 43 Rue Cuvier Paris, France	Professor Pierre Lacombe, Director Laboratoire d'Oceanographie Physique Museum National d'Histoire Naturelle 43-45 Rue Cuvier 75005 Paris, France
Professor P. Tchernia Museum d'Historie Naturelle de Paris 43 Rue Cuvier Paris, France	Professor P. Tchernia Laboratoire d'Oceanographie Physique Museum National d'Histoire Naturelle 43-45 Rue Cuvier 75005 Paris, France

Table 9-2 (Continued)

Dr. Norbert Untersteiner, Program Director Project AIDJEX 4059 Roosevelt Wave, N. E. Seattle, WA 98105	Dr. Norbert Untersteiner AIDJEX Coordinator University of Washington 4059 Roosevelt Way, N. E. Seattle, Washington 98105
Dr. Donald V. Hansen, Director Physical Oceanography AOWL NOAA U. S. Department of Commerce Miami, Florida	Dr. Donald V. Hansen, Director Physical Oceanography Laboratory AOML/NOAA 15 Rickenbacker Causeway Virginia Key Miami, Florida 33149
Vincent E. Lally National Center for Atmospheric Research P. O. Box 1470 Boulder, Colordao 80302	Mr. Vincent E. Lally National Center for Atmospheric Research P. O. Box 3000 Boulder, Colorado 80302
J. Lentfer Wildlife Research U. S. Department of Interior 813 D. Street Anchorage, Alaska	Mr. Jack W. Lentfer Fish and Wildlife Service Department of Interior 4454 Business Park Blvd. Anchorage, Alaska 99503
H. Brann Bureau of Meteorology Melbourne, Victoria Australia	Mr. H. N. Brann Bureau of Meteorology P. O. Box 1289K Melbourne, Victoria 3001 Australia
Robert Kee Development Engineering Division Code 6201 U. S. Naval Oceanographic Office Washington, D. C. 20390	Mr. Robert Kee Code 6220 U. S. Naval Oceanographic Office Washington, D. C. 20373

Table 9-2 (Concluded)

F. Anderson South African Council for Scientific & Industrial Research Congella, Natal, South Africa	Mr. Frank P. Anderson CSIR, Institute for Technology P. O. Box 17001 Congella 4013 South Africa
H. Stommel Professor of Oceanography MIT Cambridge, Massachusetts	Professor Henry Stommel Department of Meteorology Room 54-1416 Massachusetts Institute of Technology Cambridge, Massachusetts 02139
B. Buck Polar Research Lab. Santa Barbara California 93101	Mr. B. M. Buck, President Polar Research Laboratory, Inc. 123 Santa Barbara Street Santa Barbara, California 93101
John A. Knauss Graduate School of Oceanography University of Rhode Island Kingston, Rhode Island 02881	Dr. P. L. Richardson Woods Hole Ocean Institute Woods Hole, Massachusetts 02543

5.9 T&DRE Corrections to the User's Guide

There are no T&DRE corrections to the User's Guide.

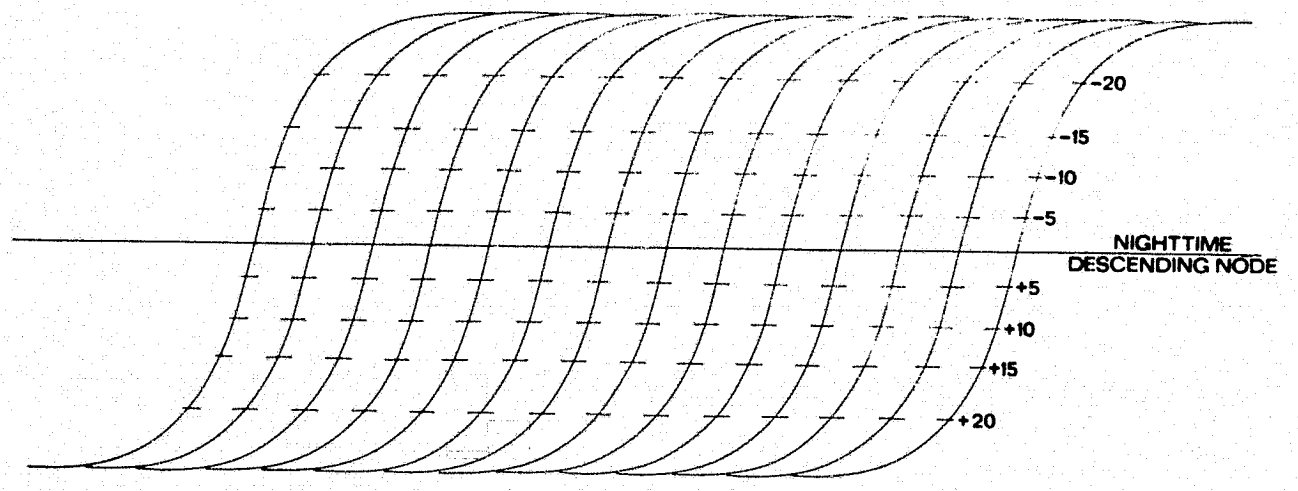
Table 5-15

The following are new TWERLE users, added since launch.
This information should be added to Table 9-2
(Nimbus RAMS Experiments) on page 186 in the User's Guide.

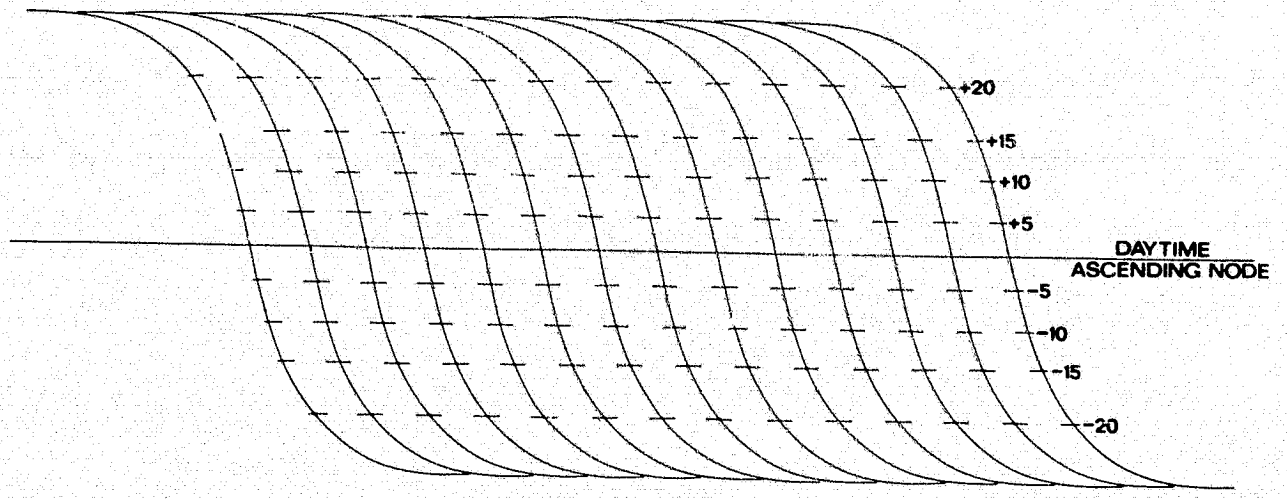
Principal Investigator	Experiment Title	Platform		
		Number	Type	Deployment Area
Dr. A. D. Kirwan, Jr. Department of Oceanography College of Geosciences Texas A & M University College Station, Texas 77843	Anomaly Dynamics Study (ADS)	32	Drifting Buoys	North Pacific
Mr. David F. Thomas, Jr. SATD-MEB-SDS, Mail Stop 322 NASA Langley Research Center Hampton, Virginia 23665	Air-droppable In Situ Platforms for Long Duration Measurements near Hurricanes	10	Ocean Platforms	Western Atlantic near North America
Dr. P. Roger Williamson Department of Applied Physics & Information Science University of California – San Diego La Jolla, California 92037	Stratospheric Monitoring with Longterm Balloon Flights	3	Super-pressure Balloons	Southern Hemisphere
Mr. J. C. O'Rourke Canadian Marine Drilling Ltd. P. O. Box 200 Calgary, Canada T2P 2H8	Arctic Ice Dynamics	2-4	Sea Ice Platforms	Beaufort Sea
Dr. J. Michael Hall NOAA Data Buoy Office National Space Tech Office Bay St. Louis, Mississippi 39520	East Coast Drifting Experiment	24	Drifting Buoys	Atlantic Ocean
	High Impact Detection and Determination on Large Buoys	10	Buoy	Atlantic Ocean, Gulf of Mexico, & North Pacific Ocean
	Reliability Enhancement Experiment	3	Buoy	Santa Barbara, California & Arctic Ocean
Mr. Robert Oehlkers University of Wisconsin Space Science and Engineering Center 1225 W. Dayton St. Madison, Wisconsin 53706	Buoy Experiments in Lake Michigan	10	Buoy	Lake Michigan

Table 5-15 (Continued)

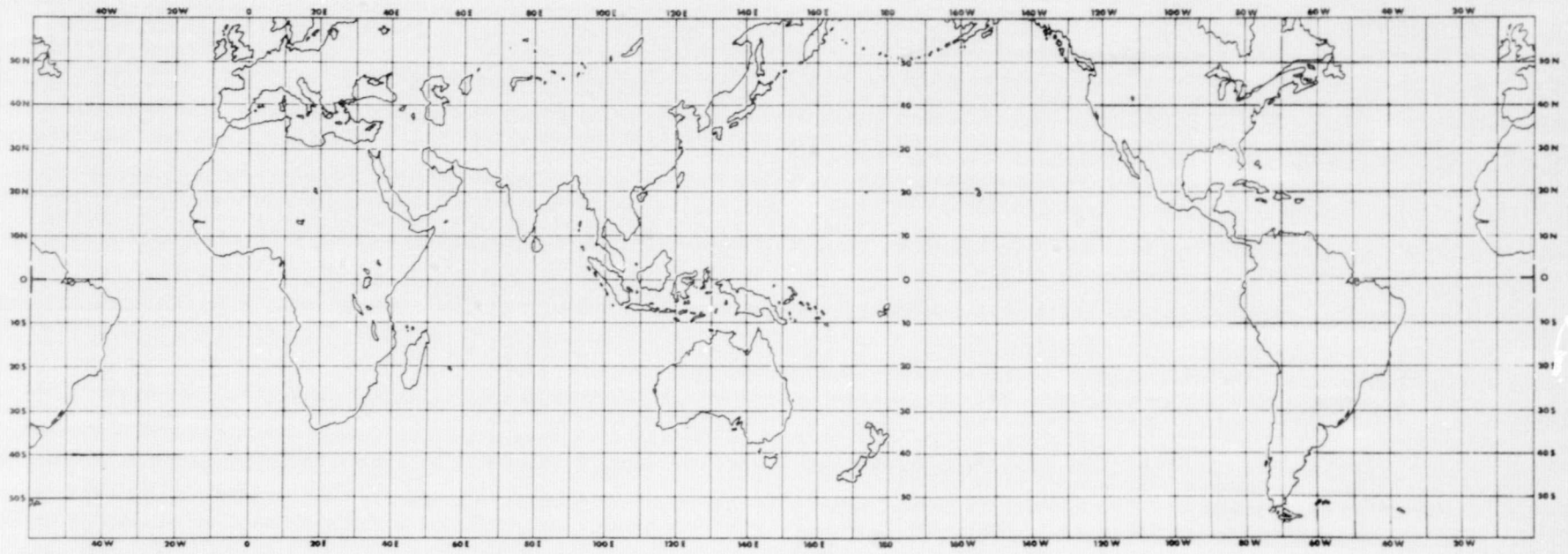
Capt. E. A. Delaney USCG Oceanographic Unit Bldg. 159E Navy Yard Navy Yard Annex Washington, D.C. 20590	North Atlantic and Labrador Current Studies	1	Drifting Buoys	North Atlantic, Labrador Coast
Dr. R. H. Goodman Innovative Ventures, Ltd. 4632 11th St. Calgary Alberta, Canada T2E2W7	Ice Monitoring in the Canadian Arctic and Labrador Region	2	Drifting Buoys	Canadian Arctic, Labrador
Dr. D. Halpern NOAA Pacific Marine Env. Labs. Univ. Washington WB10 Seattle, Washington 98195	Ocean Circulation Studies and Pacific Equatorial Waters	3	Drifting Buoys, Moored Buoys	Mid-Pacific Equatorial



NIMBUS SUBSATELLITE TRACKS OVERLAY



NIMBUS SUBSATELLITE TRACKS OVERLAY



LOCATION GUIDE
AVERAGE SCALE FOR NIMBUS
THIR NIGHTTIME MONTAGES